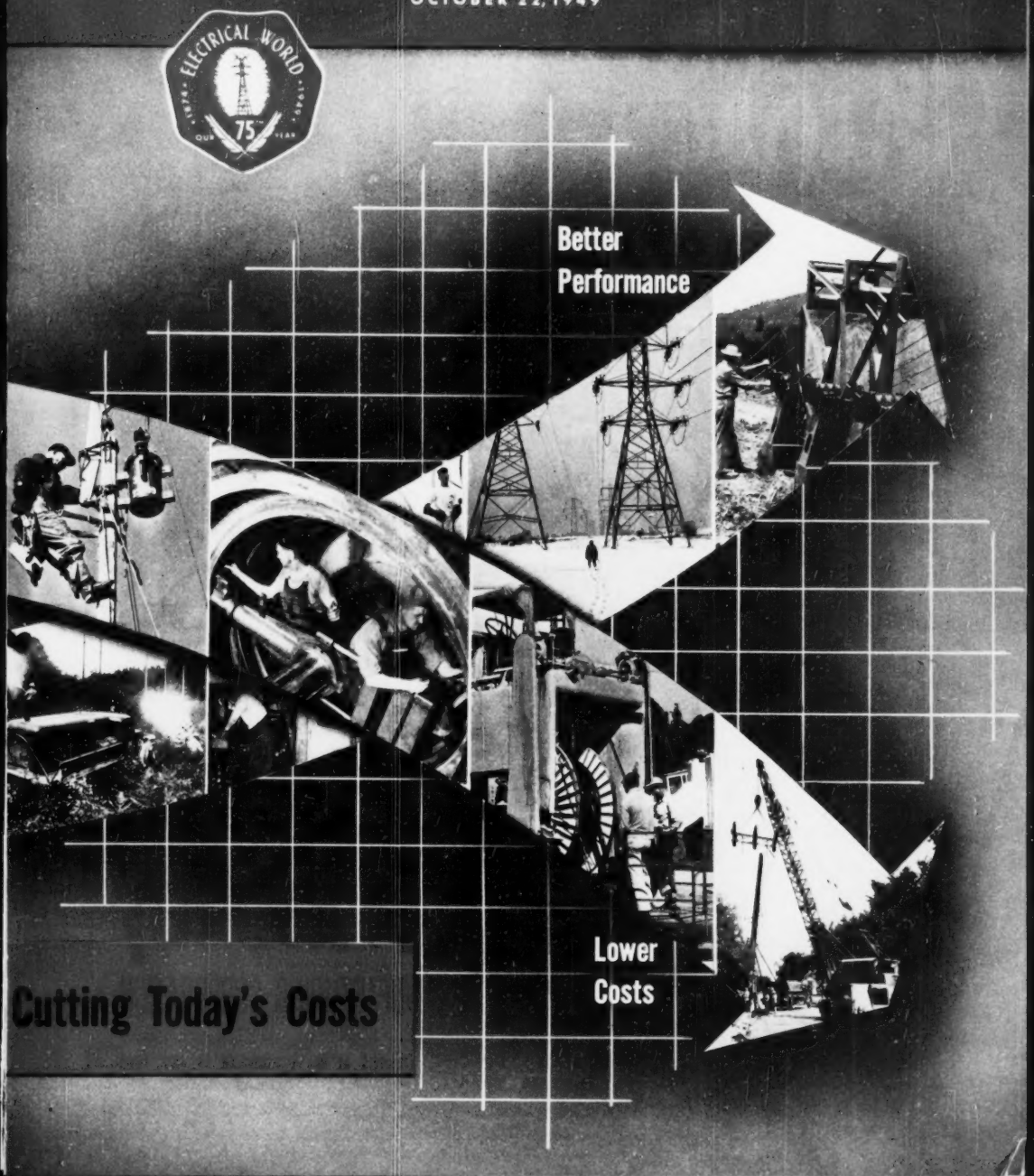
ELECTRICAL WORLD

A McGRAW-HILL PUBLICATION

OCTOBER 22, 1949

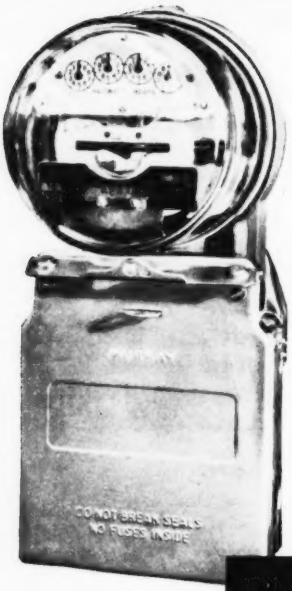


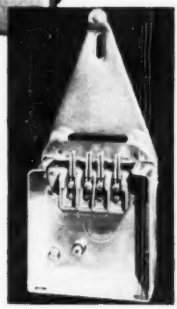
Cutting Today's Costs

Indoors . . . Outdoors

THE Murray "9600" Meter Connection Box

IS BUILT TO LAST





Dependable, trouble free service is yours with the versatile "All-Service" Murray "9600" Meter Connection Box. Designed to accommodate modern bottom-connected Type A watthour meters, it is eminently satisfactory for either indoor or outdoor mounting. Available in either unpainted aluminum or rust-resisting steel with baked-on gray melamine finish.

Greater depth provides 20% more wiring space. Only one seal is needed — hinged sealing cover does away with sealing studs and bar. Complete with meter test and connection block, and four formed copper test links. Detailed specifications are given in Bulletin No. 501.

Plenty of hand room is provided in this compact Murray Aluminum Socket. Solderless terminals take up to No. 1 wire. Two types—with or without 1" knockout in back. Cat. No. 1540.

Multiple meter mountings are simplified with this typical Murray Three Gang trough. Similar troughs are available to accommodate two to six meters. Cat. No. 583.

FOR TOMORROW'S LOADS . . .
Equip Today!

Murray MANUFACTURING CORPORATION

50 Years of Service to the Electrical Industry

1250 ATLANTIC AVENUE • BROOKLYN 16, NEW YORK

SERVICE ENTRANCE & METER EQUIPMENT • MAGNETIC CIRCUIT BREAKERS
SWITCHES • CURRENT LIMITING REACTORS • CROWS'NEST AERIAL LADDERS

ELECTRICAL WORLD

Published for 75 years for those engaged in the business of generating, transmitting, distributing or applying electric power

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CUTTING TODAY'S COSTS

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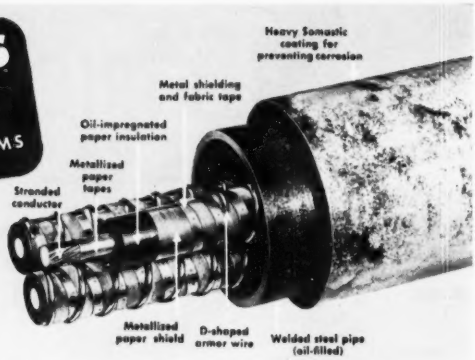
ANY WAY YOU FIGURE IT . . .

FIRST CHOICE IS OILOSTATIC

HIGH-PRESSURE PIPE-TYPE CABLE SYSTEMS



FIGURED BY CIRCUITS . . . it's 4 to 1 (for generator leads — 100%)

Here are the figures by circuits installed or under contract as of September 1, 1949:

Pipe-Type System	Transmission Circuits	Generator Lead Circuits
High-Pressure Oil (Oilostatic Type)	44	25
Compression Oil	5	—
High-Pressure Gas	11	—
Compression Gas	2	—
Total	62	25

A total of 87 circuits of all types have been purchased and, of these, 80% (69 circuits), are of the Oilostatic type. For generator lead circuits alone, 100% are of the Oilostatic type. Okonite-Callender has supplied 56 of the 69 Oilostatic type circuits.

FIGURED BY UTILITIES . . . it's 3 to 1

Here are the figures by number of utilities purchasing these systems:

Pipe-Type System	No. of Utilities
High-Pressure Oil (Oilostatic Type)	21
Compression Oil	3
High-Pressure Gas	4
Compression Gas	2
Total	30

A total of 27 *separate* power and light companies have purchased high-pressure pipe-type systems, one having as many as 12 separate circuits in operation. Only three utilities have installed 2 types of cable systems. Oilostatic-type systems, however, have been purchased by 21 or 3 out of 4 of these 27 utilities.

OTHER OILOSTATIC FIRSTS in High-Pressure Pipe-Type Cables

- 1st transmission system, 1935
- 1st application of high-pressure 161-kv potheads, 1935
- 1st generator lead installation, 1941
- 1st cabinet-type packaged pumping unit, 1946
- 1st submarine crossing, 1947
- 1st termination directly into transformer, 1949

There are good reasons why Oilostatic* high oil-pressure pipe-type cable systems have become the predominant choice of power and light companies within so few years. Oilostatic type systems offer a combination of advantages that increase circuit reliability, save money and labor.

Higher Dielectric Strength — entirely immersed in oil under 200 lbs. pressure to insure its high dielectric characteristics; no voids in the insulation, therefore no ionization.

Greater Simplicity — space saving: no ducts, no lead sheath; no riser cable problems; relieves congestion at points where overhead lines are impractical; also saves space in generator stations.

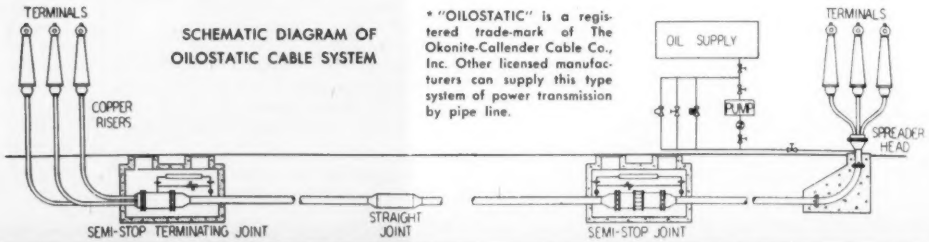
Easy Installation — all phases installed simultaneously in pulls up to 3600 ft.; simple joints and terminals.

Broad Transmission Applications — highest current carrying capacity under emergency overload; no practical voltage limit; cables can be furnished for any present-day operating voltages.

Substantial Savings — when used in preference to a duct system, savings from 15 to 30% are obtained in city street installations; in open country 25 to 40% may be effected.

Same installation for land or submarine projects — unaffected by elevation, contour or nature of terrain.

Quick and easy to install, of rugged construction and requiring very little maintenance, dependable Oilostatic may be the answer to your problem when handling bulk power. For complete installation and operating details, let an Okonite engineer consult with you. Also, for your information and help is Okonite's 16 mm. colored, "Oilostatic" film, supplemented by Oilostatic File Folder EW 75. Both are available upon request. Call or write to The Okonite Company, Passaic, New Jersey.



SCHEMATIC DIAGRAM OF OILOSTATIC CABLE SYSTEM

* "OILOSTATIC" is a registered trade-mark of The Okonite-Callender Cable Co., Inc. Other licensed manufacturers can supply this type system of power transmission by pipe line.

OKONITE-CALLENDER paper insulated power cables

7743

TOP LINES
for all lines

. . . are available from Graybar

For distribution or transmission lines — construction or maintenance — Graybar has all the *supply* lines you need. You can count on every item, because Graybar's standards of selection are tough! Everything Graybar distributes is a product of a leading manufacturer. Its efficiency and reliability have been tested, proved, and improved through years of research and field service.

POLES AND CROSSARMS

Graybar-selected poles — full-length pressure-treated pine and fir; and full-length pressure-treated, butt-incised cedar. Rainier fir crossarms that have the proven strength and durability to resist taxing combinations of heavy conductor load and shock from snow, ice, and wind.

Wire, strand, hardware

Crapo strand and high-strength static wire to fit your specifications . . . Hubbard braces, brackets, and racks for long-lasting pole structures . . . Chance pole anchors for guying of all types . . . Reliable connectors for quick, secure tap-offs . . . rugged O-B insulators . . . and everything else the project requires!

ALL THE TOOLS, TOO!

Help your linemen do each job quickly, efficiently, and safely — supply them with all the proper tools. Graybar has everything from pliers and rubber gloves to FWD line trucks. To round out our complete service, there is a Graybar Outside Construction Specialist to consult with you on any special problem "from the bottom of the hole to the top of the pole." *Graybar Electric Company, Inc. Executive Offices: Graybar Building, New York 17, New York.* 4955

You get the best of everything electrical
Via GraybaR

IN OVER 100 PRINCIPAL CITIES

YOU CAN AVOID THIS WORRY

An eastern utility, hard hit by last week's sleet storm, will begin an immediate campaign for tree-trimming rights. Officials believe that customers who have been out of service for two or three days because of lines dropped by falling trees won't be too reluctant to sign. — From Electrical World, January 10, 1948.

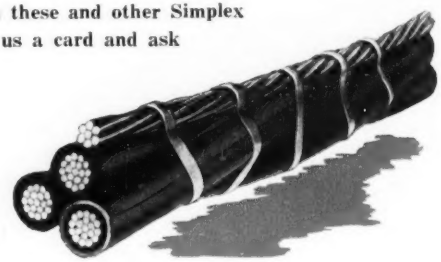
No need, this winter, to worry about failures of overhead power lines, nor about customer relations either — not if you act now and investigate the many advantages of installing Simplex-ANHYDREX Self-Supporting Aerial Cables.

Here's why: You'll find the Anhydrex insulation over conductors and the outer neoprene jacket ideal for year-in, year-out aerial service. Anhydrex has excellent electrical properties and remains exceptionally stable when exposed to water and moisture. Neoprene is unexcelled for protection against fungus, sunlight, foul weather hazards, and the abrasion caused by swaying limbs and chafing against poles.

You'll discover how economical these cables are. Bound at the factory to their own supporting messenger, they are shipped to you ready for installation. Fewer workmen are needed to do the job. The cables can be clamped to poles already standing. Crossarms and insulators are unnecessary. Maintenance is easy and inexpensive.

You'll see how effectively these cables eliminate the wintertime worries mentioned above. As the circuit is entirely insulated, with the copper bindings providing a grounded path on the outside, little or no tree-trimming is required. During heavy storms the strong supporting messenger retards line breaks due to falling limbs and ice-loading. And even when poles fall, the well-protected cables will often continue to operate efficiently without danger to passers-by.

Why not get the complete story on these and other Simplex Aerial Cables right now? Simply drop us a card and ask for Catalog 1006.



SIMPLEX WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

RUST, SLUDGE, FOAM are OUT

...WHEN Texaco Regal Oils (R & O) are in!

YOU have a greater margin of safety when you use *Texaco Regal Oils* (*R & O*). These highly refined oils contain additives that inhibit rust and sludge formation . . . are specially processed to prevent foaming. They separate rapidly from entrained air and water . . . give extra long service life.

Count on *Texaco Regal Oils* (*R & O*) to keep turbine lubricating systems clean . . . to assure the constant flow of cool, clean lubricant that keeps bearings fully protected . . . to maintain smooth, instantly responsive governor action. *Texaco Regal Oils* (*R & O*) meet the stringent requirements of all leading turbine builders, and the turbine oil specifications of the U. S. Navy.

A Texaco Lubrication Engineer will gladly recommend the proper viscosities to assure maximum efficiency and operating economy for *your* turbines. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write:

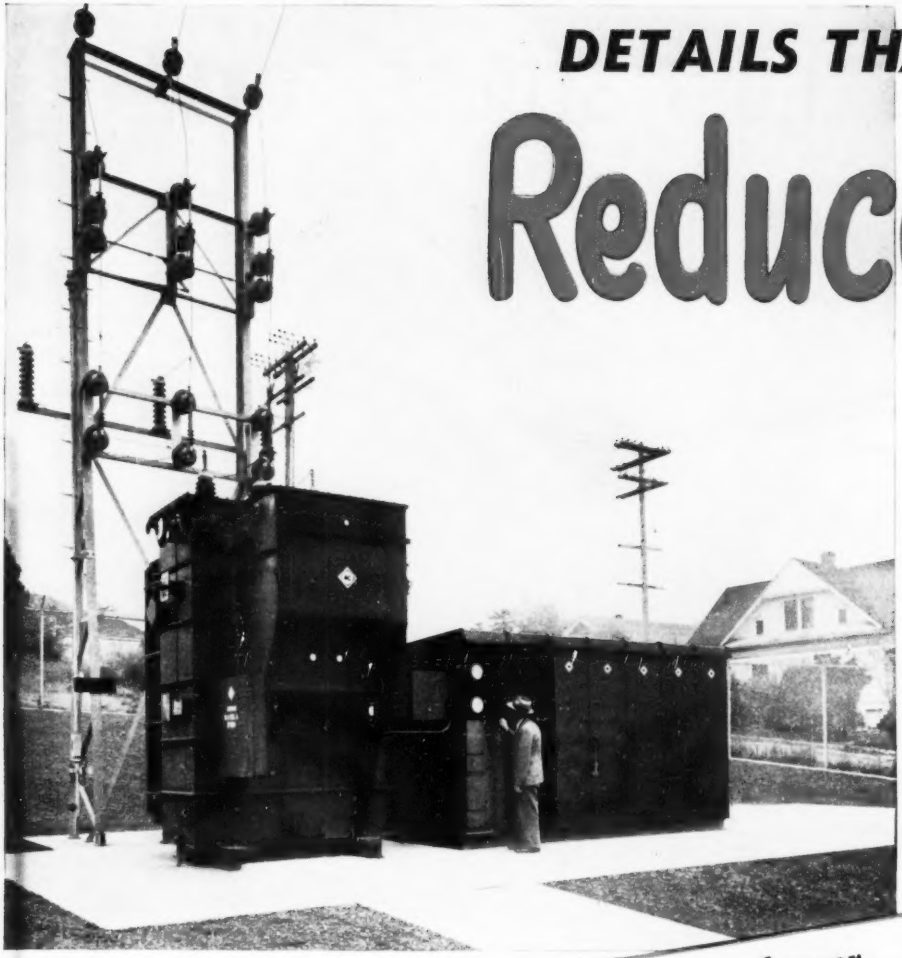
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

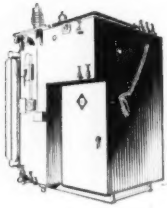
TEXACO

TEXACO Regal Oils (R&O)

FOR ALL TURBINES

DETAILS THAT Reduce





SCS SINGLE CIRCUIT unit substations consist of a transformer, secondary breaker and control, *Oil-Sealed* inert gas system for protecting oil, and the 32-5/8% step-type regulating mechanism for 10% range of regulation — all combined within a single housing. They are installed as a unit.

✓ Oil-Sealed Inert Gas Transformer

To all the protective advantages of the inert-gas-over-transformer-oil principle . . . the Oil-Sealed system gives the added advantages of operating pressures usually less than one pound! Stress and pressures are reduced on gaskets, on terminal board, on the entire transformer structure.

And inspection is made easier too. One look at the oil level gauge in the conservator and the entire inspection is complete! Gauges are conveniently located on the side of the transformer . . . easy to see . . . easy to read. The Oil-Sealed inert gas system is always in balance. Continual recharging is not required. There are no valves to adjust. No gas is wasted. There are no external bottles to replenish. Inspection is simplified, maintenance reduced.

A-2814

SPEED-UP INSPECTION . . .

Maintenance

IN ALLIS-CHALMERS UNIT SUBS

TRANSFORMER—TAP CHANGING MECHANISM—SWITCHGEAR . . . every part of an Allis-Chalmers Unit Substation is built with added attention to details of construction and arrangement that result in quicker inspection—reduced maintenance.

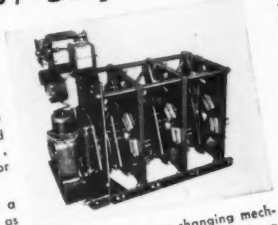
Details like potential and control power transformers that are *drawout mounted* . . . finger-type disconnects located *on the breakers* . . . and A-C's "quick break" contact separation that lengthens contact life are good points to compare when considering unit substations for your distribution system.

Another benefit is undivided responsibility for performance of the complete substation. And less paper work, quicker installation mean added economy. For the full story on what Allis-Chalmers Unit Substations and planning can mean in your distribution system, call your nearby A-C representative. Or, if you prefer, write direct.

ALLIS-CHALMERS, 932A SO. 70 ST.
MILWAUKEE, WIS.

✓ Original 5/8% Step Regulation

Allis-Chalmers pioneered the 5/8% step type "quick-break" regulation to give you the simplest, most dependable tap changing mechanism on the market! This ruggedly built unit is entirely immersed in oil for maximum life . . . to eliminate the need for periodic maintenance.



It holds fluctuations to a narrow band . . . low as ± 1%! Variations are averaged by a voltage integrator which controls the tap changing mechanism. Feather touch control panel is conveniently located in a weatherproof cabinet on front of transformer at shoulder level.

Fast — reliable — close regulation improves customer satisfaction — increases revenue.

✓ Accessible Switchgear

Designed for ready inspection and simplified maintenance, switchgear compartments are accessible through full length hinged doors both front and rear. Relays, potential and control power transformers are drawout mounted. Circuit breakers are of the horizontal arc interruption type with finger-type disconnects mounted on the removable breaker element. Vertical lift design means breaker disconnects that are visible . . . assures safe inspection because the breaker and accessories can be operated through actual control circuits with positive assurance that breaker primary contacts are not engaged.

This greater accessibility and safety results in quicker inspection . . . lower maintenance through better care.

A-C ALLIS-CHALMERS

Feather-Touch and *Oil-Sealed* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

"Originators of 5/8% Step Regulators!"

Get this Low Cost Oil Protection

IN YOUR NEXT SUBSTATION TRANSFORMER

Sealed Tank Design

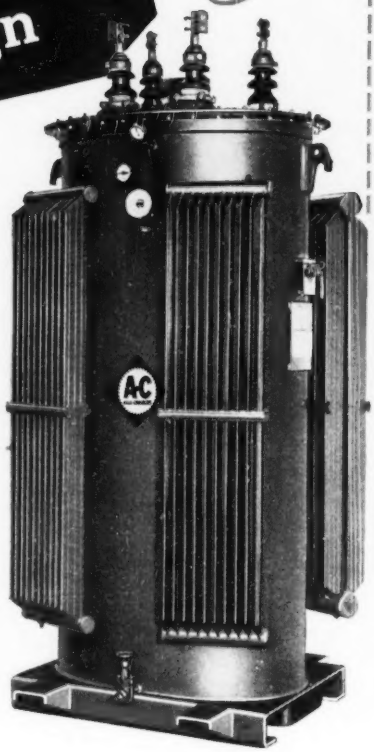
SIMPLE . . . PROVEN . . . readily adaptable to lower kva power transformers at *lower cost* . . . these are reasons why Allis-Chalmers Sealed Tank design is recommended for power transformers 34.5 kv and less, 2500 kva and below.

By providing an air-tight seal, atmospheric oxygen and moisture are permanently sealed from transformer oil, thus preserving its dielectric qualities and preventing formation of sludge.

Sealed Tank design is just one of several types of Allis-Chalmers oil protection. Others include the famous *Oil-Sealed* Inert Gas and the *Expansion Tank* methods . . . each designed for greatest effectiveness in its own range and type of application.

For further information on A-C oil protection, or any other phase of Allis-Chalmers quality transformer construction, contact your A-C sales representative. Or write direct. A-2799

ALLIS-CHALMERS, 932A SO. 70 ST.
MILWAUKEE, WIS.



✓ *SIMPLE* . . . . No wearing parts . . . no expensive alarm systems required . . . no replenishment schedule to follow.

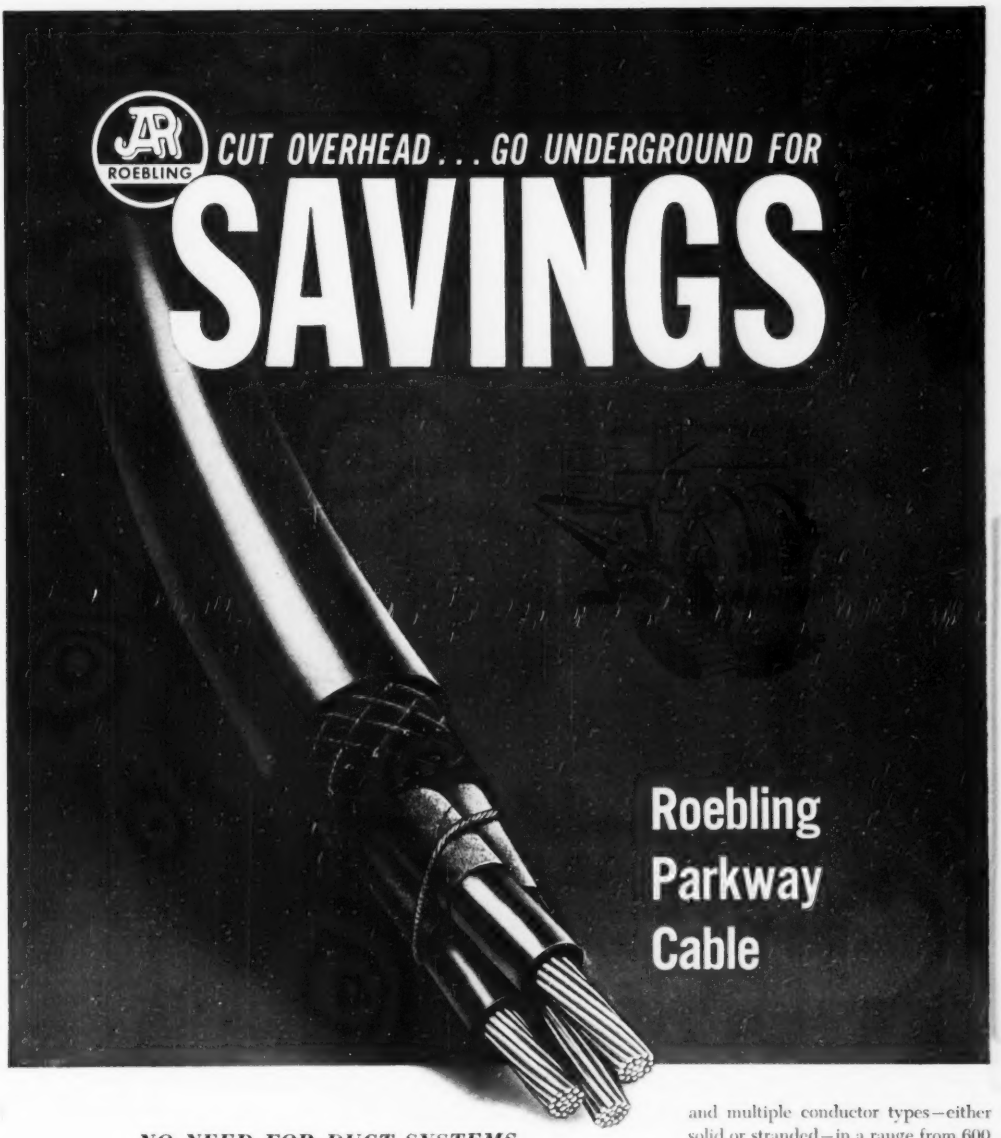
✓ *PREVENTS SLUDGE*. . . Filtering requirements are reduced because oxygen and moisture are *positively* sealed out.

✓ *PREVENTS ACIDITY* . . . Positive moisture seal also prevents formation of harmful acids — helps to preserve transformer insulation.

✓ *LOW OPERATING TEMPERATURE* . . . Cooling ducts are kept open because oil remains sludge-free . . . permits cool, efficient operation of transformer.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS



NO NEED FOR DUCT SYSTEMS

ROEBLING PARKWAY CABLE is laid directly in the ground. No complicated and costly duct systems . . . a trench only two or three feet deep is ample and economical. Once installed, you can count on Roebling Parkway for trouble-free and uninterrupted service.

You have the choice of Roebling Parkway Cable with metallic armor or with a non-metallic, roeprene sheath that affords dependable physical protection. Both can be supplied in single and multiple conductor types—either solid or stranded—in a range from 600 to 5000 volts.

Your nearest Roebling distributor or Roebling office will be glad to help you select the best cable for your particular requirements. Call on them for any desired assistance. John A. Roebling's Sons Company, Trenton 2, New Jersey.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

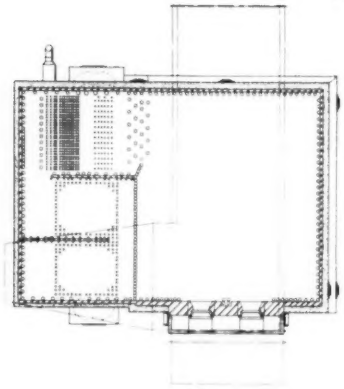
Atlanta, 931 Avon Ave. ★ *Boston*, 51 Sleeper St. ★ *Chicago*, 5525 W. Roosevelt Rd. ★ *Cleveland*, 701 St. Clair Ave., N. E. ★ *Denver*, 1635 17th St. ★ *Houston*, 6216 Navigation Blvd. ★ *Los Angeles*, 216 S. Alameda St. ★ *New York*, 19 Rector St. ★ *Philadelphia*, 12 S. 12th St. ★ *Pittsburgh*, 855 W. North Ave. ★ *Portland, Ore.*, 1032 N. W. 14th Ave. ★ *San Francisco*, 1740 17th St. ★ *Seattle*, 900 First Ave.

ROEBLING

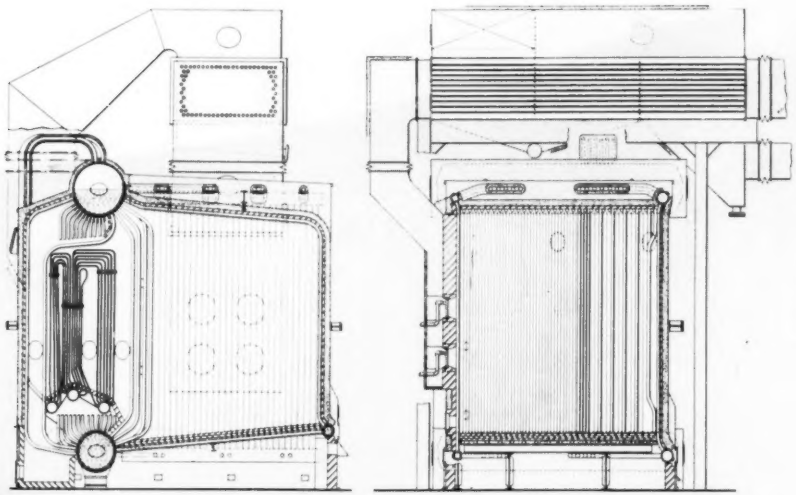
☆ A CENTURY OF CONFIDENCE ☆

"FRESH AIR" BOILERS

help cut cost of NEW

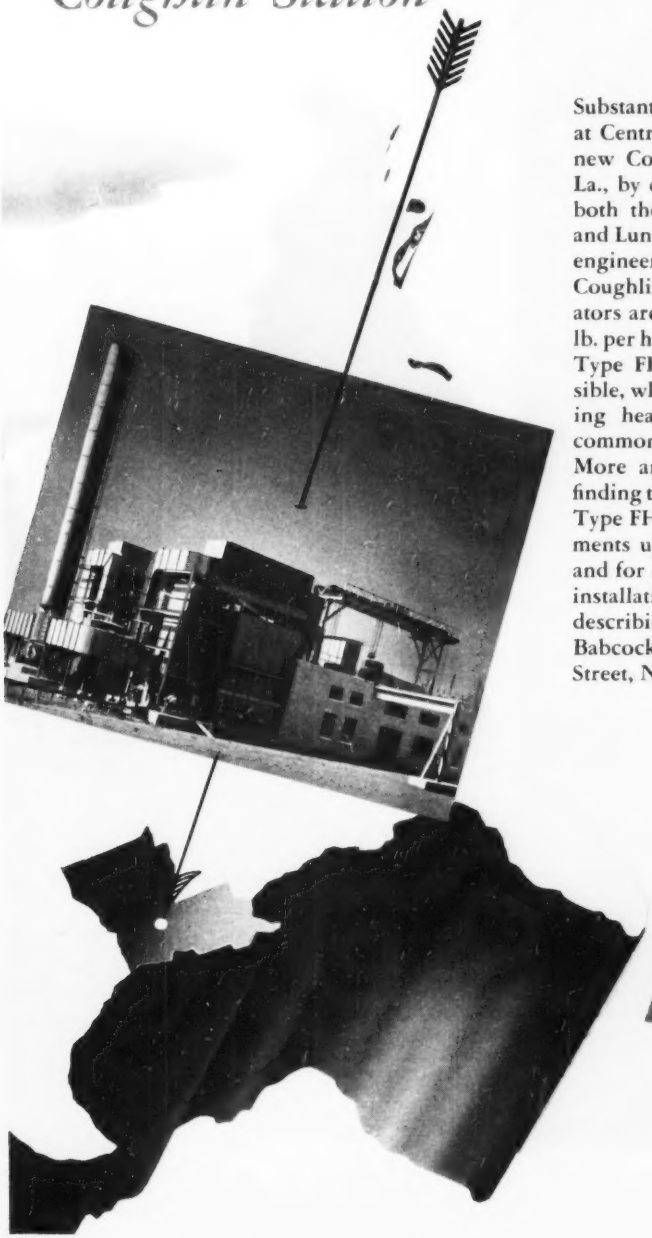


Another Cost-saving outdoor installation of B&W Steam



Two gas-fired Integral-Furnace Boilers, Type FH, of this design, at the new Coughlin Station of Central Louisiana Electric Company, have a total steam capacity of 180,000 lb. per hour at 625 psi, and 835F total temperature.

Coughlin Station



Substantial first-cost savings were realized at Central Louisiana Electric Company's new Coughlin Station near St. Landry, La., by complete outdoor installation of both the boilers and turbines. Sargent and Lundy, Chicago, were the consulting engineers.

Coughlin Station's two 7,500 kw. generators are served by two identical 90,000 lb. per hr. B&W Integral-Furnace boilers, Type FH. Criss-cross operation is possible, when needed, and a single deaerating heater and single evaporator are common to both units.

More and more power companies are finding the B&W Integral-Furnace Boiler, Type FH, the best buy for steam requirements up to 350,000 pounds per hour, and for outdoor as well as conventional installations. Write for bulletin G-38 describing this popular boiler unit. The Babcock & Wilcox Company, 85 Liberty Street, New York 6, N. Y.

B&W

BABCOCK & WILCOX

G-436

Tops IN THE MILE-HIGH LEAGUE!

● The Public Service Company of Colorado handles electricity and gas distribution and transmission for its customers in the mountainous north-central portion of the state. For maintenance work, for readings, for "cutting in" new equipment in inaccessible areas where other means of communication are not available, the company finds G-E radio an indispensable, money-saving tool.

This utility's trouble trucks, line trucks, patrol vehicles and compressors, as well as supervisors' cars are in touch with one another and with headquarters at Denver by radio.

J. M. Wissenbach, Engineering Department, shown above, reports that dispatching by G-E radio *materially cuts elapsed time between receipt of complaint and adjustment of trouble.*

General Electric specializes in radio communication systems for utilities faced with difficult problems of terrain or weather. For complete information call the G-E office nearest you or write: *General Electric Company, Box 1122, Electronics Park, Syracuse, New York.*

Before You Select Any Radio Communication Equipment—

Get This Bulletin FREE!

Colorful booklet about General Electric radio communication will be sent to you on request. Ask for it.

You, too, can put your confidence in—

GENERAL ELECTRIC

A SUPER-HIGHWAY FOR CURRENT

NO EXPOSED CONTACTS at hinge . .

with **SPHC***

Above is the complete 34.5 Kv., 600 Ampere switch. At top—enlarged portion of hinge and blade mechanism.

*Sealed Pressure Hinge Contact

This new Sealed Pressure Hinge Contact development is truly an ingenious feature at this very critical point. Current flow is unhindered by exposed joints or break contacts.

Completely enclosed and weather-sealed, Hi-Pressure, Hi-Thermal capacity, silver to copper contact is a super-highway for current. Continuous, annular, constant electrical and mechanical contact at all times —entirely eliminates any second break contact. Current carried through BOTH hinges.

Only one "break" contact is necessary on a switch. Why have more than one—which creates another critical point?

✓ CHECK these extra FACTS

1. **JAW CONTACT**—Hi-Pressure, Hi-Thermal capacity silver-to-copper. The ONLY "break" contact on the switch.
2. **BLADE MECHANISM**—Simple, harmonic, self-locking, accurately controlled blade motion.
3. **BLADE**—One-piece, hard drawn copper.
4. **TERMINALS**—Four-bolt, equal height from base.
5. **BEARING**—Greaseless, weather-sealed, stainless ball bearing.

I-T-E R&IE

RAILWAY and INDUSTRIAL ENGINEERING CO., GREENSBURG, PA.

IN CANADA: EASTERN POWER DEVICES LIMITED, TORONTO

An I-T-E ORGANIZATION

The Check List

CONDUCTOR SUPPORTS
CLAMPS AND FITTINGS

DISCONNECTING SWITCHES
INDOOR AND OUTDOOR

HORN GAP SWITCHES

INTERRUPTER SWITCHES

CUTOUTS AND THERMO-RUPTERS

DISTRIBUTION EQUIPMENT

SWITCH OPERATING MECHANISMS

SUBSTATIONS

OPEN OR ENCLOSED ISOLATED PHASE HEAVY DUTY BUSES

KIRK INTERLOCK SYSTEMS

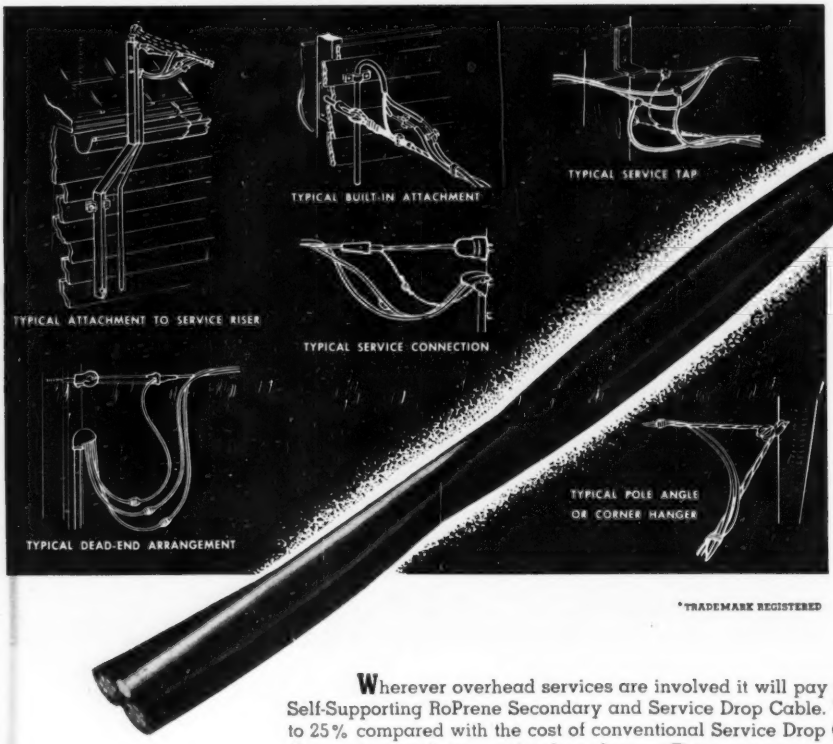
AUTOMATIC SWITCHING EQUIPMENT

METAL CUBICLES

TESTING DEVICES

SAVE UP TO 25%...

with Rome Self-Supporting RoPrene Secondary and Service Drop Cable



Rated at 600 volts with maximum continuous copper temperature of 80° C.

*TRADEMARK REGISTERED

Wherever overhead services are involved it will pay you to use Rome Self-Supporting RoPrene Secondary and Service Drop Cable. You can save up to 25% compared with the cost of conventional Service Drop Cable (Type SD). Construction is better and it lasts longer. There are no coverings to rot and festoon. It has remarkable weather resistance. It possesses excellent physical and electrical characteristics.

Installation and maintenance costs are also less than the cost of open weatherproof wire. Less labor and cheaper hardware can be used. When used as secondaries, Rome Self-Supporting RoPrene Cable is more compact, eliminates unsightly multiple wire construction, jointly occupied poles and long spans. On larger sizes, there is also a substantial saving in copper losses due to the lower reactance of a self-supporting cable compared with open wires.

NEW DATA AVAILABLE!—BULLETIN RS-4, just published contains specification and test details, as well as sag and tension data on Rome Self-Supporting RoPrene Cable. It's yours for the asking. Sign and mail the coupon below or write.

IT COSTS LESS TO BUY THE BEST...BUY ROME CABLE

ROME CABLE CORPORATION, Dept. EW-10, Rome, N. Y.
Please send me Bulletin RS-4

Name ..... Title .....

Company .....

Street .....

City ..... Zone ..... State .....

ROME CABLE
Corporation
ROME • NEW YORK
From Bar to Finished Wire

ROME CABLE ROME, N.Y.

Marmon-Herrington

ALL-WHEEL-DRIVE

wherever the going is tough

There are literally hundreds of tough trucking jobs that trucks of conventional drive can't handle. Lack of tractive power is the big reason.

Marmon-Herrington *All-Wheel-Drive* Trucks are the made-to-order answer. Live power and traction in all wheels—*front wheels pulling, rear wheels pushing*—gives them the sure-footed tractive power of crawler tractors, plus truly amazing speed and maneuverability. Here are trucks that carry on where those of conventional drive stop—trucks capable of transporting peak payloads through deep mud, sand and snow, up steep hills and mountain grades—speedily, easily, economically.

Marmon-Herrington offers twenty-two *All-Wheel-Drive* models in all. Four are heavy-duty models of the company's own manufacture; the balance are standard Ford models converted to *All-Wheel-Drive* by Marmon-Herrington. Wheelbases range from 110 inches to 220 inches—gross vehicle weights from 5,300 pounds to 42,000 pounds. There are 7 great engines, Diesel and gasoline—from 4 to 10 forward speeds, 1 to 4 reverse.

For a demonstration of almost unbelievable performance-ability, see your Marmon-Herrington *All-Wheel-Drive* Truck dealer. There's one near you.

MARMON-HERRINGTON COMPANY, INCORPORATED

MARMON-HERRINGTON

Indianapolis 7, Indiana

NOW a complete line of POLE STAR Transformers from 3 KVA through 100 KVA . . .

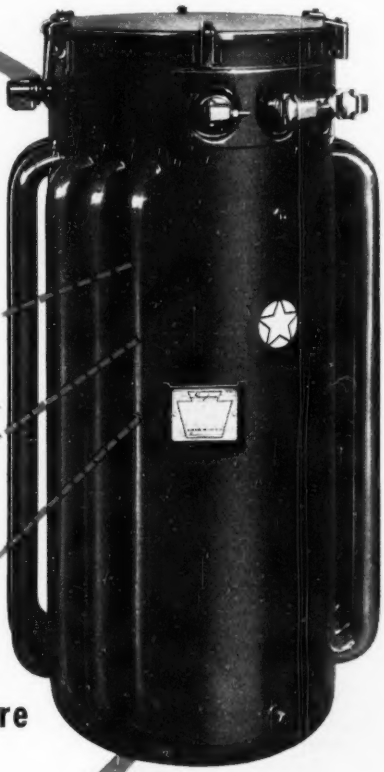
PENNSYLVANIA TRANSFORMER POLE STAR TRANSFORMERS TO

The New 100 KVA POLE STAR TRANSFORMER

is **35%** *lighter*

requires **36½%** *less oil*

covers **35½%** *less floor area*



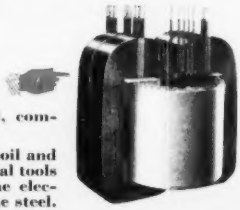
than the 100 KVA Stacked Core Transformer it replaces

PENNSYLVANIA POLE STAR TRANSFORMER

P.S. let the POLE STAR be your guide

Product Of Long Experience

Safe, Thrifty And Reliable



- Core and coil unit — small, compact, light in weight
- Core can be removed from coil and reassembled without special tools and without changing the electrical characteristics of the steel.

COMPANY EXTENDS ITS LINE OF SIZES 37½, 50, 75 AND 100 KVA

POLE STARS ARE BETTER!—that's the reason PENNSYLVANIA is introducing four new POLE STAR Transformers to replace four conventional type units. POLE STARS are better from the Customer's point of view, from the Operator's point of view, and from the Manufacturer's point of view. POLE STAR Transformers possess better electrical and mechanical characteristics; they are more economical to operate, less costly to store and easier to install.

The new POLE STAR Transformers are lighter in weight and smaller in dimensions than the stacked core transformers they replace. As a matter of fact, weights are down as much as 40%, cubical dimensions as much as 37%, and volume of oil as much as 50%.

COILS EASILY REPLACED IN THE FIELD

The POLE STAR wound core is designed to embody all the advantages of cold rolled steel, plus the advantages inherent in the conventional stacked core, such as the ease of removing the core and replacing the coil. The POLE STAR core can be taken apart and rebuilt without special tools and without changing the core loss or exciting current of the transformer.

LOW EXCITING CURRENT

Because laminations are individually lapped there are no gaps or butt joints in the core. The large cross section area at the lap reduces the density and prevents a concentration of flux. This lap construction assures a low exciting current.

All POLE STAR Transformers are built in accordance with A.S.A. and E.E.I.–NEMA Standards and are, therefore, of Sealed Tank Construction.

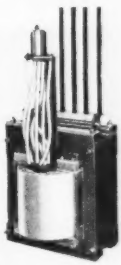
We invite you to inspect the New POLE STAR Transformers and study their merits. If you are interested in arranging such an inspection, please write to us at Box 330, Canonsburg, Pa. You'll find the POLE STAR worth looking into.

Pennsylvania TRANSFORMER COMPANY

CANONSBURG, PENNSYLVANIA

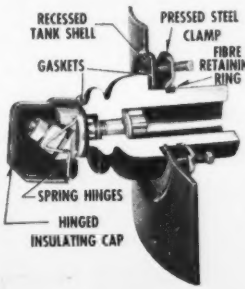
Greater Pittsburgh District

- Cover Bushings for 7200 to 14400 Volt Transformers
- Synthetic rubber gaskets
- Round tubes expanded into tank wall and welded internally



Write for Catalog No. 1049.

- Core frames independent of core and exert no pressure on core
- Coils firmly braced between insulating blocks
- Snap action tap changer



- No pockets on the POLE STAR
- Rugged, side-issuing High Voltage bushings for 2400 and 4800 volt transformers
- Lathe turned, pugged clay bushings

- Line connections made with standard wrench
- Insulating cap swings in and out of position
- Line leads enter terminals from downward angle

Cables run COOLER...
in TRANSITE DUCTS

... reducing copper losses

... increasing current capacity

... prolonging insulation life

HERE'S HOW to reduce copper losses . . . increase current carrying capacity . . . and prolong insulation life—run your cables in Transite* Ducts.

Current carrying capacities can be increased in a typical duct bank as much as 5%, or I^2R losses can be reduced 11%, for cables located in Transite as compared with other ducts used for power circuits.

And, Transite Ducts assure permanent duct banks because Transite is incombustible; is immune to rust and rot; is unaffected by electrolysis; will not slag under action of an arc, and will retain its high original strength.

An unusually smooth bore assures no injury to cable sheath, either in natural movement under load, or when pulling-in cables. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated of installations.

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, N. Y.

JM

*Reg. U. S. Pat. Off.

How Transite Ducts increase current carrying capacities

Type cable 3 cdr. 500 MCM Compack Sector, 15 KV (6th Edition AEIC Spec.)
No. of cables—3 (all loaded in one bank)
Daily Load Factor—75%

Earth Temp. ambient—20 C	Transite	Other
Total Therm. Res. to Dielectric Loss (C watts/ft.)	5.66	6.17
Total Therm. Res. to Copper Loss (C watts/ft.)	4.44	4.95
Temp. Rise from Dielectric Loss (C)	1.9	2.1
Allowable Rise for Copper Loss (C)	59.1	58.9
Allowable Watts per ft. cable	4.44	3.96
Allowable Current—(Amps. per cdr.)	386.	365.
Allowable Current—(Relative %)	105.6	100.

Johns-Manville *Transite Ducts* **"KORDUCT"— for encasement in concrete**

"CONDUIT"— for use exposed and underground without encasement

PACIFIC ELECTRIC

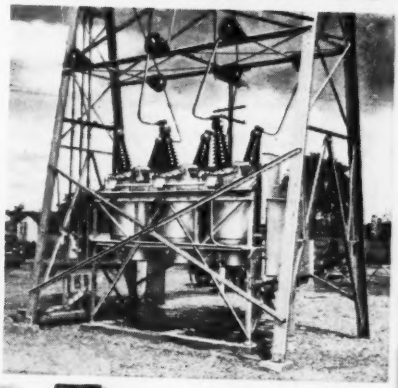
BREAKERS

69 kv, Type JE-42

Extra-Fast

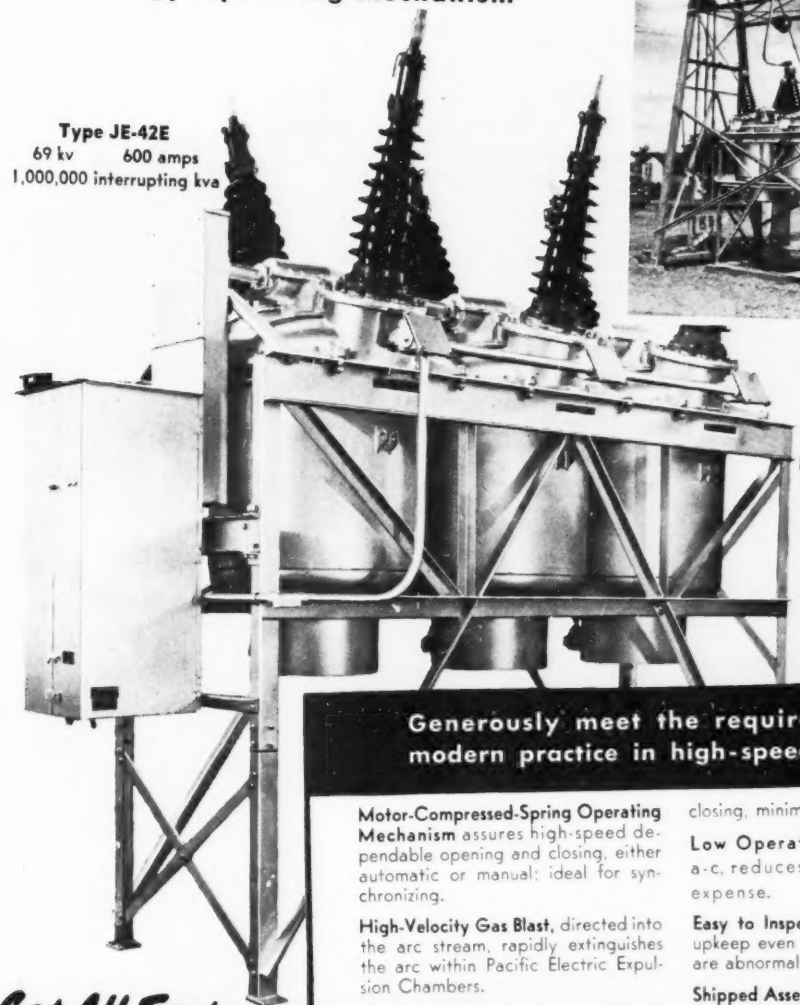
Fault Interruption and Reclosures

by Motor-Compressed-Spring Stored-Energy Operating Mechanism



Breaker and Switching-Tower Unit in Operation

Type JE-42E
69 kv 600 amps
1,000,000 interrupting kva



Ratings Available

Type JE-42E
69 kv 600 amps
1,000,000 interrupting kva

Type JE-42F
69 kv 1200 amps
1,500,000 interrupting kva

Type JE-42 G
69 kv 1200 amp
2,500,000 interrupting kva

Generously meet the requirements of modern practice in high-speed relaying

Motor-Compressed-Spring Operating Mechanism assures high-speed dependable opening and closing, either automatic or manual; ideal for synchronizing.

High-Velocity Gas Blast, directed into the arc stream, rapidly extinguishes the arc within Pacific Electric Expulsion Chambers.

High-Speed Tripping, for opening and closing, minimizes dead time.

Low Operating Current, d-c or a-c, reduces battery or rectifier expense.

Easy to Inspect and Maintain—Low upkeep even when fault interruptions are abnormally frequent.

Shipped Assembled—Fully tested and adjusted at the factory.

Get All Facts . . .

Call

PACIFIC ELECTRIC MFG. CORPORATION

5815 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA • P. O. BOX 419, GARY, INDIANA

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PIERCE G. FREDERICKS, 90 West St., New York 6, N. Y.
J. E. REDMOND SUPPLY CO., 625 W. Madison St., Phoenix, Ariz.
G. B. KIRKWOOD, 422 S. Hill St., Los Angeles 13, Calif.
MARRS & WENDEGATZ, 526 Dwight Bldg., Kansas City 6, Mo.
KRIPPNER and POLLEY, 1 Downing St., Denver 9, Colo.
F. W. GORMAN, P. O. Box 222, El Paso, Texas
L. C. HARDIE, P. O. Box 1491, Des Moines 6, Iowa
BRUECK ENGINEERING CO., 53 W. Jackson Blvd., Chicago 4, Ill.
C. C. MUSGROVE, 506 Southland Bldg. Annex, Dallas 1, Texas
WILLIAMSON & WILMER INC., 612 Mutual Bldg., Richmond 19, Va.
EDGAR F. HUBERT CO., 510 Statler Bldg., Boston 16, Mass.

Other Representatives in Principal Cities

American B-4

CREW COMPARTMENT-LINE CONSTRUCTION BODY

Tools and Crew ARRIVE ON THE JOB Ready for Work

The American B-4 carries 7 men comfortably... four in the body crew compartment and three in the cab. Plenty of leg and head room without knee hugging.

Warm in winter, cool in summer, the crew compartment has full body width, good visibility and ventilation. Shelves and racks take care of gloves, matches, lunch boxes, iced water cask and dozens of other items necessary to a crew. One of the most popular features is a collapsible table for convenience of the men.

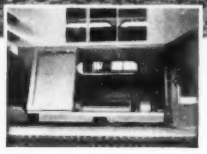
Equally important, the B-4 has space for all of the diversified equipment needed for line work. Roomy, locked compartments on each side of body carry small items. Inside, the big body has ample space and 12 swivel material hooks.

The derrick tunnel permits easy loading and unloading of derrick at shoulder height. Ladder racks are adjustable. Extended platform protects men when loading or unloading material, and gives additional body floor capacity.

The B-4 body can be mounted on any conventional or C.O.E. type of chassis. There are three body lengths . . . 132", 156" and 168". CA dimensions range from 83" to 113".

Complete information on the universally used B-4 is yours for the asking.

For those who prefer a line body without crew compartment . . . American offers the DPL.



The tilting crew seat on the B-4 gives the driver a clear view of winch, another safety feature.

THE American COACH & BODY COMPANY

MAIN OFFICE AND PLANT — 9503 WOODLAND AVE., CLEVELAND 4, OHIO
CALIFORNIA DIVISION — 432 FIFTH STREET, OAKLAND 7, CALIFORNIA

SALES OFFICES: INSURANCE EXCHANGE BLDG. DES MOINES 9, IA. · 207 LAKE STREET MONROE, N. Y. · HEALEY BLDG. ATLANTA, GA.

DISTRIBUTORS: BAKER EQUIPMENT ENGINEERING CO. SUMMIT & NORFOLK STS. RICHMOND 11, VA. · EQUIPMENT SERVICE, INC. 1 WAWARME AVE. HARTFORD 1, CONN.

ACB and

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

A New 100-AMPERE Type GR Recloser...

For Rural and Suburban Distribution

- 100 amperes—continuous current rating
- 2,000-2,500 amperes—interrupting rating
- Full 15-kv insulation (110-kv impulse withstand)
- Interrupts 2,000 amperes with full 15 kv across one pole
- Heavy top casting and deep-drawn tank—both heavily hot-dip galvanized
- *One* fast, and *three* time-delay openings, or *four* time-delay openings
- Bushings, mechanism, hangers—all interchangeable with 50-ampere series
- Five coil sizes available—25, 35, 50, 70, 100

The 100-ampere GR Recloser is available for immediate delivery now. Use it to provide complete, economical protection for your rural *and suburban* lines. For complete information, ask your Westinghouse representative or distributor for Bulletin B-4339, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60721

Westinghouse
GR RECLOSERS

LOOK for the Stackpole Minute Man . . . your guarantee of expertly engineered molded materials.

Specialists for over a third of a century in MOLDED CARBON, GRAPHITE, METAL POWDERS, and MOLDED COMPOSITION MATERIALS.

STACKPOLE CARBON CO., ST. MARYS, PA.

STACKPOLE

BRUSHES AND CONTACTS

(All carbon, graphite, metal, precious metal, and composition types)

SINTERED ALNICO II — PUMP and FLUID DRIVE SEALS — IRON CORES
COIL FORMS — CARBON PIPE — BRAZING TIPS
WELDING CARBONS — CHEMICAL CARBONS — CARBON RHEOSTAT PILES
CARBON DISCS — FLASHLIGHT BATTERY CARBONS — POWER TUBE ANODES
ELECTROLYTIC ANODES — FIXED & VARIABLE RESISTORS, etc., etc.

Data on any type on request

Kentucky Utilities Company, Inc.
chooses
Steel Towers
for 138 K. V. Single Circuit Line

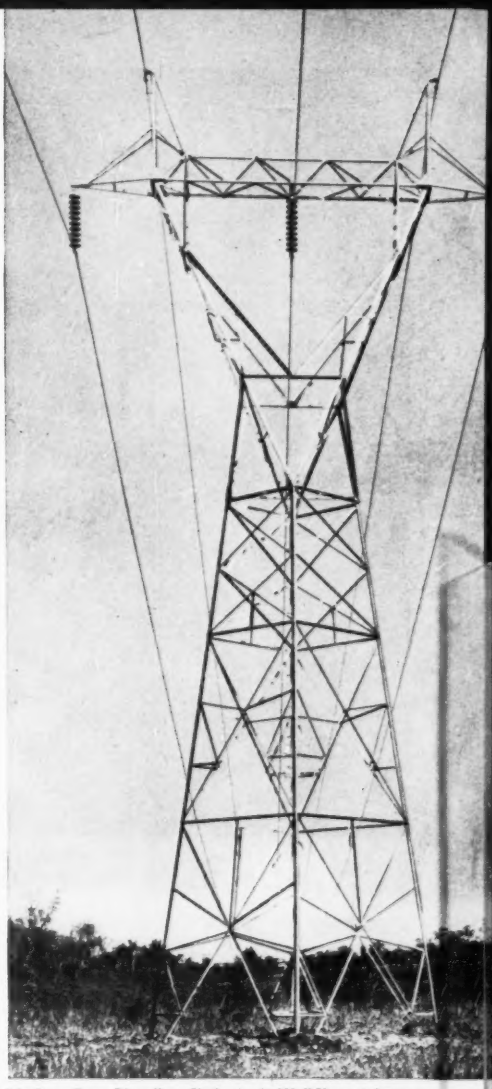
● When Kentucky Utilities Company, Inc., selected American Bridge light steel towers for its 138 K.V. single circuit line, it found that these towers made possible more severe design conditions because they had sufficient strength to carry longitudinal, transverse and vertical loads. Also, Kentucky Utilities found that foundation erection was quicker and cheaper because the circular steel grillages of the towers were designed to permit machine boring of anchors. Conductors and ground wires were carried in the most economical spans and the exact arrangement desired. And, like most things made of steel, these towers have the stamina to provide extra years of service.

To help you take advantage of the outstanding superiority of steel for structures of this type, American Bridge Company makes available its experience and facilities for designing, fabricating and erecting. Why not submit any questions you might have to our nearest Contracting Office.

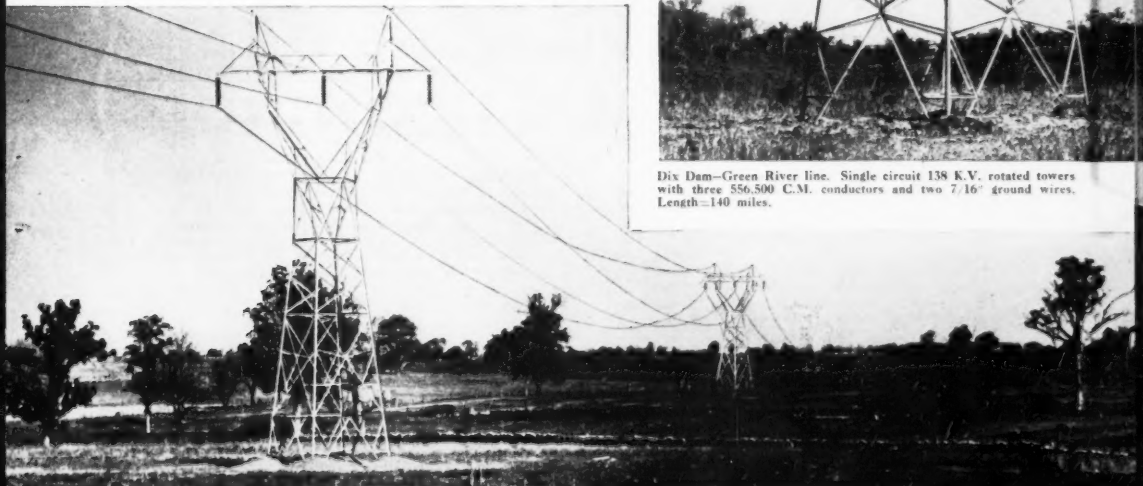
AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Contracting Offices in: AMBRIDGE · BALTIMORE · BOSTON · CHICAGO · CINCINNATI · CLEVELAND · DENVER
DETROIT · DULUTH · ELMIRA · GARY · MINNEAPOLIS · NEW YORK · PHILADELPHIA
PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · SAN FRANCISCO · TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



Dix Dam—Green River line. Single circuit 138 K.V. rotated towers with three 556,500 C.M. conductors and two 7/16" ground wires. Length—140 miles.

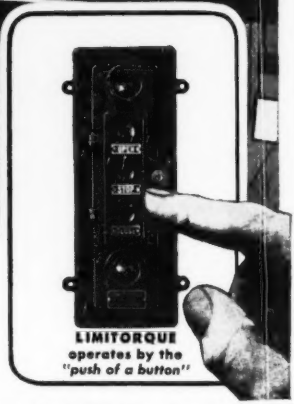


AMERICAN BRIDGE
UNITED STATES STEEL

Easy, Safe and Positive-

LIMITORQUE

..by REMOTE CONTROL



LIMITORQUE operates by the *"push of a button"*

...one man can operate any number of Valves, at any distance, from a panel board..

LIMITORQUE VALVE CONTROLS

Think of the **savings** effected in time and money by eliminating men going from one valve to another (many of which are at distant locations),—not to mention the time required to shut or open each valve. **LimiTorque Remote Control** not only prevents this waste, but enables **one man** to merely **"push buttons"** and actually see on a panelboard whether the valves are open or closed. Then too, there is the important **safety factor** afforded by **LimiTorque Remote Control,** because men do not have to go to high, low, dangerous or inaccessible locations to open and close valves. Still further, **LimiTorque prevents damage** to seats, discs, stems, etc., because it **"automatically" shuts-off the power,** should an obstruction in closing occur.

Various **LimiTorques** are available for different requirements on all types of valves (globe, gate, butterfly, plug, etc.)—and too, **LimiTorques** may be supplied for actuation by any power source, such as electricity, steam, water, gas, oil or air.

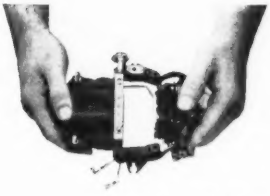
Thousands of LimiTorques are in use throughout the world, on land and sea. Be convinced; send for our 96-page catalog, L-48, and please use your Business Letterhead when requesting same.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON
IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

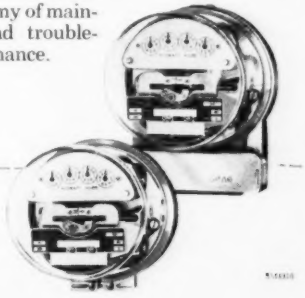
Are your lightning losses as low as this?



Only 96 cases of lightning damage in 9 years with more than 58,000 J Meters installed is the record of one company serving rural customers in a Midwestern area. Are your lightning losses as low as this?

Sangamo's separable electromagnetic element makes it easy to replace either the potential or the current element when these infrequent failures occur. In the Type J Meter a cellulose acetate shell completely encloses the potential coil providing unusually high breakdown level between all surfaces of the coil and adjacent grounded parts. High dielectric strength is also characteristic of the modern, superior insulating materials which isolate the current coils.

Reduce your overall lightning losses by increasing the percentage of modern meters on your system. Sangamo J Meters have proved their ability to meet the requirements of today and the anticipated loads of the future with sustained accuracy, economy of maintenance, and trouble-free performance.



50TH ANNIVERSARY SANGAMO 1899 - 1949

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

NEW UTILITY STATIONS C-E EQUIPPED

Includes stations placed in operation since the war (in white) and those under construction or being engineered.

TIDD
JENNISON
CECIL LYNCH
HAVANA
MEREDOSIA
PERMIAN BASIN
O. H. HUTCHINGS
REX BROWN
HICKLING
B. C. COBB
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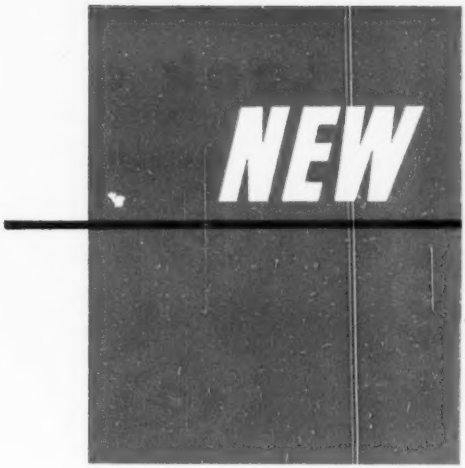
SEWAREN
POSSUM POINT
PORT JEFFERSON
CUTLER
WHITE RIVER
GADSDEN

POTOMAC RIVER

W. SPRINGFIELD
ORAN
LAKE CATHERINE
WOOD RIVER
DAN RIVER
DUNKIRK
TITUS
HUTCHINSON
BLACK DOG
DALLAS
NINEMILE POINT
EDGE MOOR
YATES
CONTRA COSTA
LEE
HAWTHORN
CLERMONT
JIM HILL
MERAMEC
DANSKAMMER
LONG BEACH



The new Potomac River Generating Station of the Braddock Light & Power Company was placed in service early in October when the first of two 80,000 kw turbine-generators went on the line. The second, a duplicate unit, is expected to be ready for service next year.

This fine new plant, located in Alexandria, Virginia, on the Potomac River, was designed and constructed by the Stone & Webster Engineering Corporation. It will add, by early summer of 1950, 160,000 kw to the generating capacity of the Potomac Electric Power Company, of which the Braddock Light & Power Company is a wholly owned subsidiary.

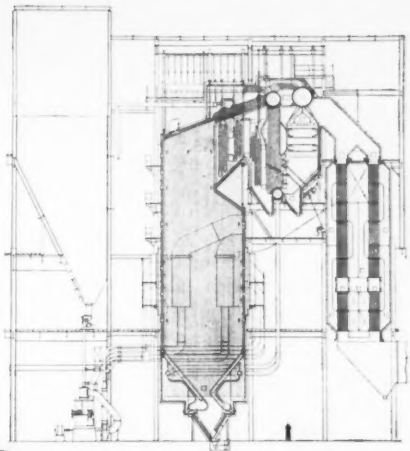
Steam for both units will be supplied by C-E Steam Generating Units in the modern one boiler-one turbine arrangement. Each boiler is designed to supply 800,000 lb of steam per hr. at 875 psi and 925 F at the superheater outlet. A brief description of the steam generating units is given on the opposite page. B-341

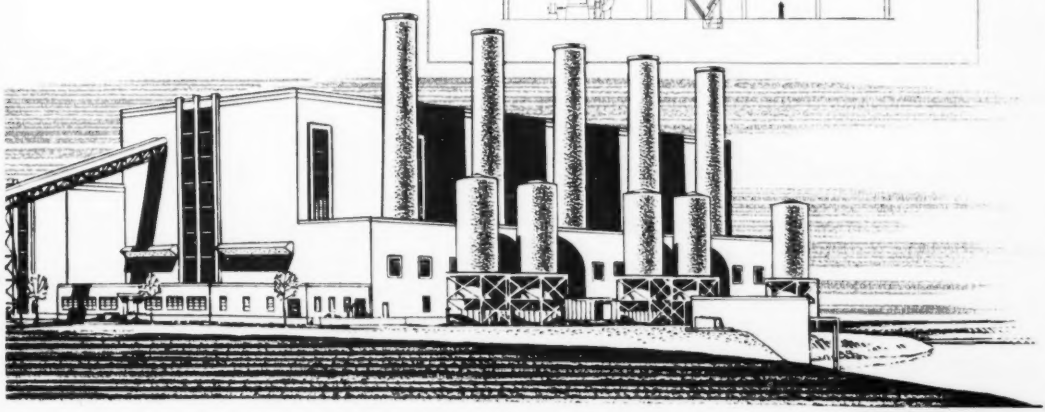
COMBUSTION ENGINEERING

A MERGER OF COMBUSTION ENGINEERING COMPANY, INC. AND THE SUPERHEATER COMPANY

Potomac River Station goes into service

The cross-section at the right shows the C-E Unit that recently went into service at the Potomac River Generating Station. It is a 3-drum boiler with 3-stage superheater and integral finned tube economizer in the rear pass. A C-E Tubular Air Heater follows the economizer surface. The fully water-cooled furnace is of the basket bottom type. The unit is pulverized coal fired, using bowl mills and vertically-adjustable, tangential burners. Provision is also made for the future use of natural gas or fuel oil if and when desired.



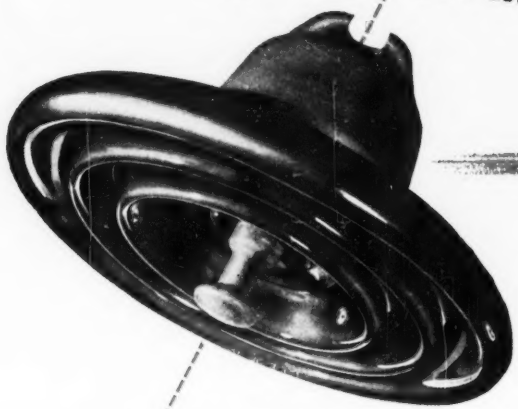


— SUPERHEATER, INC.

200 MADISON AVENUE, NEW YORK 16, N. Y.

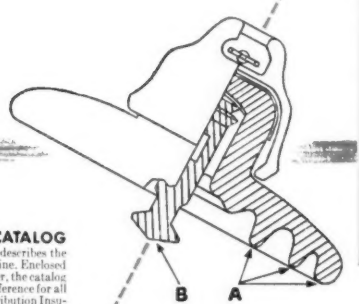
C-E

THOMAS details make a big difference in insulator life



No one part of an insulator is more important than another. Long life is dependent upon the proper balance of all electrical and mechanical characteristics. This attention to detail and manufacturing "know-how" does not come overnight. Thomas has been manufacturing porcelain insulation for 76 years and is still seeking better and improved methods of serving the electric utility industry . . . is still refining its products for more efficient insulation of transmission and distribution lines.

To you as a user of insulators, these refinements mean extra years of trouble-free performance. Specify Thomas Porcelain for all your insulator requirements . . . There are no "weak links" in Thomas Insulators.



This cutaway view is a Thomas Ten-Inch Suspension-Strain Insulator, 15,000 pounds M. & E. rating. Illustrated are two of the many plus characteristics evident in all Thomas made porcelain insulators.

A—Corrugations are rugged and thick . . . tough enough to withstand malicious or accidental breakage. Deep and rounded, they provide maximum leakage surface. Rolled edges prevent chipping and breakage. Thomas design is right . . . Thomas porcelain is tough.

B—Forged steel studs are set and held fast by high grade cement. Perfect alignment is assured, for all parts are jig assembled . . . clamped tight until cement sets. Complete interchangeability, uniform quality and long life are guaranteed with Thomas Insulators.

THIS FREE CATALOG

. . . illustrates and describes the complete Thomas line. Enclosed in a loose-leaf binder, the catalog provides a ready reference for all Transmission-Distribution Insulators and Associated Line Hardware. New insertions as issued are sent to all catalog holders.

The R. Thomas and Sons Co.

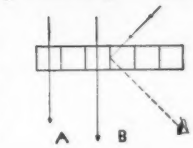
LISBON, OHIO

NEW YORK CHICAGO

AGENTS IN PRINCIPAL CITIES

Available now in any quantity—attractively priced

Corning FOTA-LITE glass louvered panels can be used in many types of recessed or pendant lighting fixtures, as well as, for continuous row or completely illuminated ceilings. It is available now in any quantity at attractive prices.



A. Light directed vertically is unrestricted.

B. Diffusing louvers intercept and eliminate eye-level glare.

FOTA-LITE makes possible shallower, dust-tight installations.

The smooth glass surface of FOTA-LITE is easy to clean.

✔ CHECK THESE IMPORTANT ADVANTAGES:

1. Fota-lite assures a 45° light cut off.
2. Fota-lite can be cut to fit almost any standard fixture where louvers or glass panels are desired.
3. Fota-lite has no sag or cold flow—it is glass. No special construction is needed for its support.
4. Fota-lite louvers do not loose efficiency over an extended period of time—they are part of the glass.
5. Fota-lite permits dust-tight fixture construction and thereby easy maintenance because only a single flat surface need be cleaned.
6. Fota-lite causes little contrast in brightness between the light sources on opal vertical surfaces because of large number of louver cells. White louvers are non-color selective.

CORNING GLASS WORKS
CORNING, NEW YORK

SEE FOR YOURSELF—SEND FOR SAMPLE

Fill out and mail coupon below or write for a free sample of Fota-lite

CORNING GLASS WORKS, (Dept. EW10), Corning, N.Y.

Send me Fota-lite demonstration card showing how Fota-lite diffuses and cuts off light at 45°.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

The BIG OCR

TERMINALS
EXTERNAL GAP
BUSHINGS
LIGHTNING ARRESTERS
COUNTER
OIL GAUGE
OPERATING COIL
COIL PROTECTING SPILL GAP
RELAY COIL
RELAY CONTACT STRIP
CIRCUIT INTERRUPTING CHAMBER

KEARNEY

The only full size OCR on the market today

DESIGNED and constructed for the increased loads of tomorrow this OCR has many advantages for the far-sighted user. The larger physical dimensions provide such desirable features as: . . . . . .

All of which means better line protection and less frequent maintenance trips. This larger automatic OCR is available with time current characteristics that permit replacement of any OCR on your line today. Operating characteristics charts are available—just specify the rating in which you are interested when making your request.

MORE OIL

HEAVIER CONTACTS

LARGER BUSHING

GREATER CONTACT SEPARATION

TWO FULL RATED NEMA LIGHTNING ARRESTERS

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Ave.
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Canadian Plant • Guelph, Ontario

Always Specify JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. *for the Job . . .*

Better Construction – *SAFER* Maintenance

will the Public Revolt *against* FLUORESCENT LIGHTING?

Will Sub-Standard Quality and Sub-Standard Performance Bring Fluorescent Lighting into Public Disfavor?

SINCE fluorescent lighting equipment was first made available ten years ago, the standards of fluorescent lighting and of fluorescent lighting equipment have been continuously IMPROVED. As a result, fluorescent lighting has quickly achieved national acceptance. This public confidence has been earned by the Lighting Industry because the great majority of the equipment produced and sold to the public has met with the high standards required to provide satisfactory performance.

TODAY the public confidence is being placed in jeopardy by the increasing occurrence of fluorescent industrial units which, instead of being built up to required standards, are being built down to a price.

How long will it take the public to wake up to unsubstantiated claims?

The public cannot be expected to understand all of the technical factors which differentiate a sub-standard unit from a unit built to deliver sustained trouble-free economical performance.

Informed electrical and lighting men know the importance of high quality starters and lampholders, in terms of easy maintenance, reliable starting and reliable operation.

They know that poor electrical and mechanical design can cause high temperature operations of the ballast resulting in decreased ballast life. They know, also, that lamp life is shortened by a ballast which supplies low starting current or by one that delivers low operating watts to the lamp. They know that low power factor ballasts do not permit efficient utilization of present wiring. They know that well designed and well constructed lighting units, such as those made to RLM Standards, will stand up and give full satisfaction to the customer.

The Remedy

It is up to the entire Lighting Industry to put this knowledge to work for the benefit of the public. This can best be done by first furnishing customers with the facts about initial cost, maintenance cost and performance of fluorescent lighting equipment and by supplying equipment which is warranted by the manufacturer and certified by an independent testing agency as meeting recognized and published standards of design, construction and performance.

This Advertisement is published in the Interest of the Entire Fluorescent Lighting Industry by

RLM STANDARDS INSTITUTE
INCORPORATED

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

326 WEST MADISON STREET • SUITE 821
CHICAGO 6, ILLINOIS

WICKWIRE ROPE

A PRODUCT OF CF&I

Ask any user . . . you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® *Preformed*. It lasts longer — is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant — Palmer, Mass.

IN THE EAST — Wickwire Spencer Steel Div. of C. F. &.
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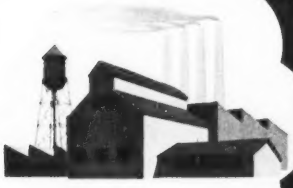
IN THE ROCKIES — The Colorado Fuel and Iron Corp.
Continental Oil Bldg., Denver, Colo.
ON THE WEST COAST — The California Wire Cloth Corp.
1080 — 19th Ave., Oakland 6, Cal.

LOGGING

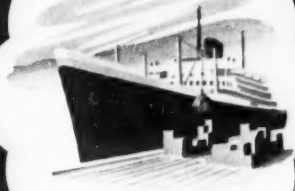
TRANSPORTATION

MINING

PETROLEUM



MANUFACTURING



MARINE

CONSTRUCTION

A. E. Brotman

Bigger Value for Every Job

CHEVROLET ADVANCE-DESIGN TRUCKS

CHEVROLET It takes a truck operator to really evaluate a truck. Yes, the man behind the wheel is the one who can best appreciate the worth of powerful yet economical performance . . . extraordinary load capacity . . . lasting quality, ruggedness and handling ease. He's the one who recognizes the advantages of new, improved features—of greater comfort and convenience for the driver. And these men in the drivers' seats—these experienced truck operators across America—know that Chevrolet trucks deliver more of the value factors they want. They know that Chevrolet trucks cost less to operate, less to maintain, and have the lowest list prices in the entire truck field. That's why they use more Chevrolet trucks than any other make! Your Chevrolet dealer will give you the facts in detail!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

TOP-VOLUME PRODUCTION BRINGS YOU TOP-VALUE FEATURES!

Chevrolet's new 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation. Double clutching is eliminated because the gears are always in mesh. Faster shifting maintains speed and momentum on grades. Available in series 3800 and heavier duty models.

Chevrolet's power-packed VALVE-IN-HEAD ENGINES provide improved durability and efficiency as well as the world's greatest economy for their size!

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

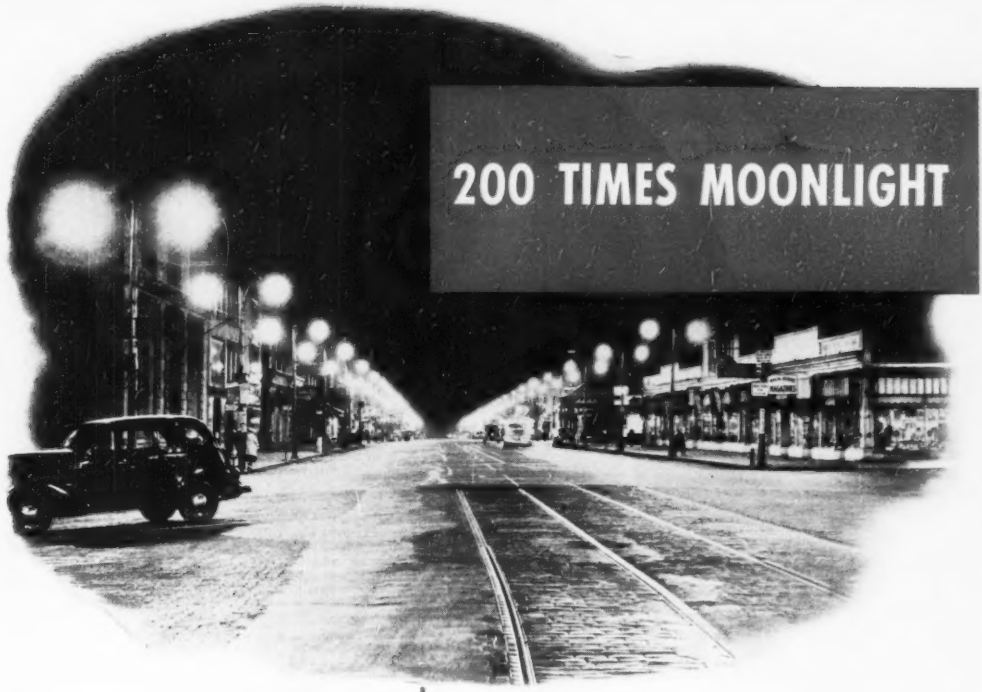
Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

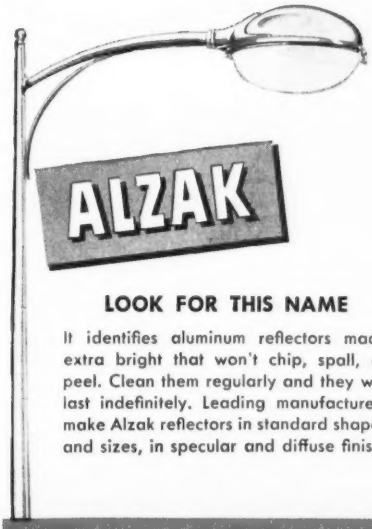
Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Unisweld, All-Steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axles in the 3600 Series and Heavier Duty Models • Double-Articulated Brake Shoe Linkage • Hydrovac Power Brakes in Series 5000 and 6000 Models • Multiple Color Options.

**Heating and ventilating system and rear corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!





LOOK FOR THIS NAME

It identifies aluminum reflectors made extra bright that won't chip, spall, or peel. Clean them regularly and they will last indefinitely. Leading manufacturers make Alzak reflectors in standard shapes and sizes, in specular and diffuse finish.

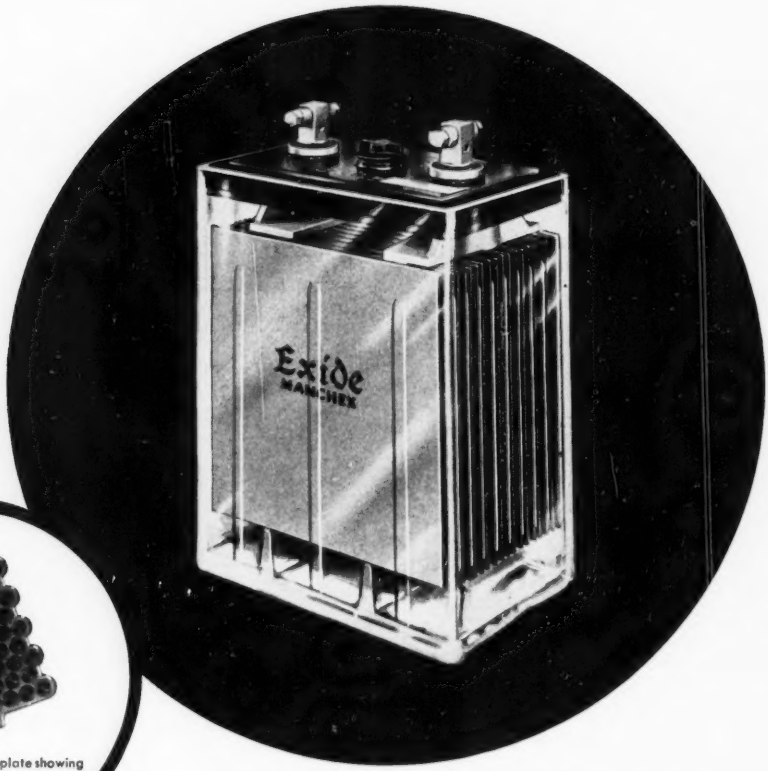
Over five foot-candles flood Falls Street in Niagara Falls, New York. That's a brilliance 200 times average moonlight. General Electric luminaires with Alzak reflectors make this street one of the world's brightest. Yet there's a note of economy here. Alzak reflectors are efficient . . . have long life . . . save lighting dollars.

Think of your lighting. Big money goes into wire, fixtures and current. Why waste that investment with poor reflectors, when Alzak reflectors give high lighting efficiency. ALUMINUM COMPANY OF AMERICA, 1978K Gulf Building, Pittsburgh 19, Pennsylvania.

ALZAK REFLECTORS
OF ALCOA ALUMINUM

ALCOA

made by Leading Lighting manufacturers



Exide-Manchex positive plate showing unique lead button construction.

The New EXIDE-MANCHEX Battery

For dependability and economy in SWITCHGEAR SERVICE

You can always count on Exide-Manchex Batteries for dependable, day-in, day-out performance in switchgear operations. They provide improved electrical characteristics, deliver increased power (watt) output per unit of space, and assure long battery life with low cost maintenance.

The many fine qualities of Exide-Manchex Batteries are due chiefly to the manchester positive plate with its unique lead button construction. The buttons, rolled strips of corrugated lead, are pressed into holes of the lead antimony grid. Forming action expands the buttons and locks them securely in place. Only a comparatively small portion of the total lead in the buttons is formed initially into active material; the remainder is available for gradual conversion in service.

Use the new Exide-Manchex Battery for switchgear service, stand-by power and other stationary battery applications. It provides up to 100% more capacity in the same given space.

Exide
BATTERIES

"Exide" Reg. Trade-mark U. S. Pat. Off.

1888... DEPENDABLE BATTERIES FOR 61 YEARS...1949

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

From Simple Alterations
to Complete
Generating Stations . . .
Pritchard's Construction Services Offer YOU
UNDIVIDED RESPONSIBILITY
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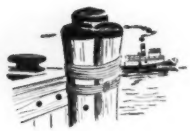
Some Common Sense
ABOUT WOOD PRESERVATIVES

The choice of a wood preservative is a serious matter in these days of high lumber costs. Proved results, rather than novelty, are the prime consideration.

That is why America's leading railroads and utilities continue to rely on Creosote Oil for the protection of their multi-million dollar investments in ties, poles and structural timber.

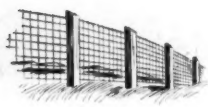


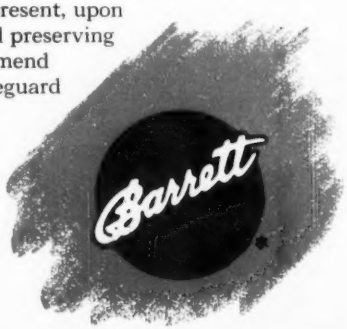
Pressure treatment with Creosote Oil is a standard method of wood preservation that has been used successfully under practically all conditions for more than 100 years.

During that time, it has proved its effectiveness beyond the shadow of a doubt. Properly applied, it regularly extends the working life of wood from 3 to 5 times, and often longer.

It is by far the most widely used wood preservative in the world.

When and if a better preserving method is developed, to the point where it can be recommended to large users of lumber, Barrett will sponsor it. At present, upon the basis of our half-century of wood preserving experience, we unqualifiedly recommend Creosote Oil as the most reliable safeguard of your lumber investment.



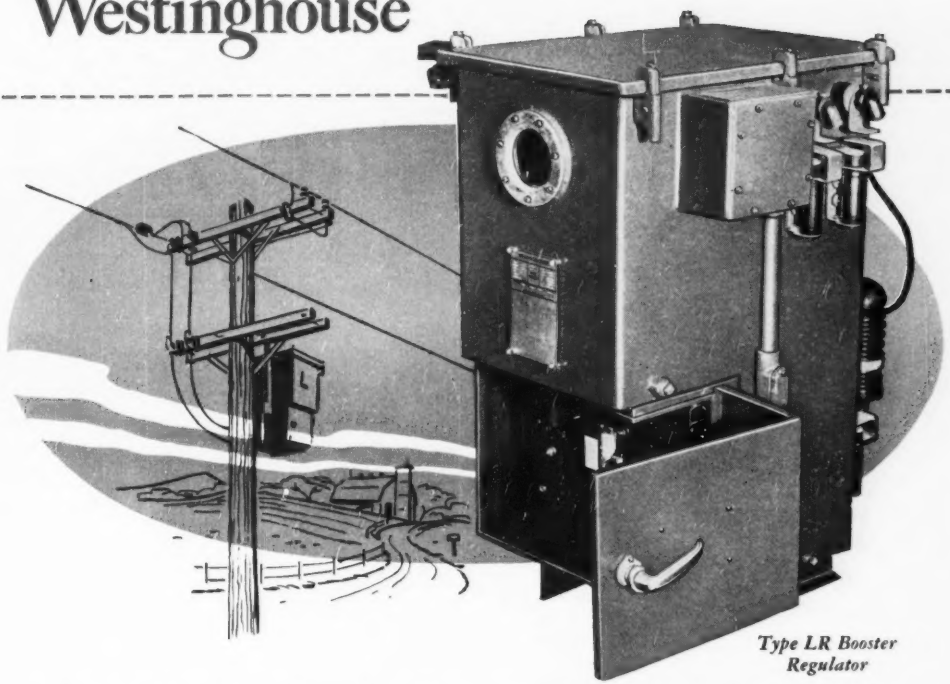


THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

•Reg. U. S. Pat. Off.

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



Type LR Booster Regulator

"Booster Regulators Eliminated 500 Customer Complaints Annually!"

This statement from a midwestern utility superintendent is backed by his own records. They prove Westinghouse Booster Regulators pay their way with customer satisfaction.

"Greatly increased load on our rural lines created serious voltage problems. Customers complained of burned-out motors, dimmed lights and late dinners. The installation of Westinghouse Booster Regulators eliminated these complaints and *substantially increased our revenue.*"

Types LR and BR Booster Regulators are compact, pole-mounted units. They provide reliable voltage control for rural lines. *Their investment costs, as compared with other methods, are slashed as much as 95%!* Installation is quick and easy. Maintenance is negligible.

For complete information about *every* voltage regulation need, call your nearest Westinghouse office, or write for C. S. 47-225, 47-230, B-4245 and Distribution Digest 50-000. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70530

Westinghouse Voltage Regulators

FOR *ANY* SYSTEM

"Your voice sounds wonderful, darling"

WHEN the boy in Los Angeles says this to the girl in New York he's saying something nice about us, too. For we, at Western Electric, make a great variety of the Bell telephone equipment that helps speed her voice to him so clearly, so naturally.

Whether you talk from coast to coast, or just around the corner, your telephone gives you a lot of satisfaction for little money. Making good equipment, that makes this kind of service possible, is Western Electric's job in the Bell System—has been for 67 years.

• Bell scientists *design*, we *produce* and telephone company people *operate* the equipment—all of us working together with one aim: Good telephone service for you at the lowest possible cost.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

Longer Life

WITH JOSLYN URC POLE LINE HARDWARE

Extend the Life Span of your pole lines by using Pole Line Hardware made of low alloy high strength steel. This steel will resist atmospheric corrosion four to six times longer than carbon steel and, with the additional protection of Joslyn galvanizing, the expected life of pole line hardware is at least doubled—and this at a negligible increase in cost. Costs of Pole Line Hardware made of URC are only approximately one-third greater than standard structural material—a cheap price to pay for double the life. In addition to this, URC hardware is stronger, with a minimum yield strength 50% greater than that of regular steel.

If you are in an area where this happens to your hardware before the ultimate life of the rest of the line has been reached—better consider Joslyn URC Hardware.

Write for new catalog of Long Life Pole Line Hardware.

Branch offices in principal cities

•

THE JOSLYN CO.
THE SOUTH EAST-JOSLYN CO.
SOUTHERN JOSLYN CO.
JOSLYN-SOUTHWEST CO.
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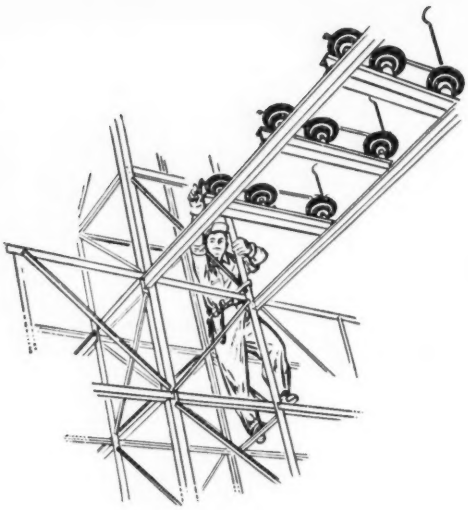
JOSLYN MFG. AND SUPPLY CO.

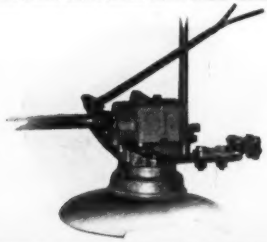
Complete Pole Line Equipment

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.



only talks

Available
200 TO 3000 AMPERES
7500 TO 287,000 VOLTS



EXCLUSIVE CONTACT HOUSING

Protects contacts against sleet, dirt and arcing. Also acts as an ice breaker.

HI-VOLTAGE

Hi-Voltage installation savings

No wonder. Only Hi-Voltage reduces switch installation cost from 20 to 40 percent.

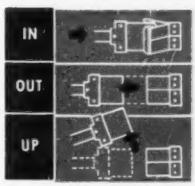
Fine engineering is the reason. Every part is designed just right, and Hi-Voltage takes time to assemble and to completely test each switch before shipment. When your crews start assembly, they find all parts clearly identified and keyed to easy-to-follow installation instructions. There's no field cutting or drilling. We've even made your final adjustments.

Your Joslyn Salesman will tell you more about installation savings and other exclusive advantages of Hi-Voltage Switches. Ask him or write Hi-Voltage Equipment Company, 4000 East 116th Street, Cleveland 5, Ohio.

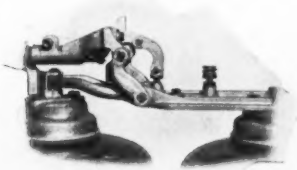
SILVER-NICKEL CONTACTS

Combine low resistance with low friction. Stainless steel springs maintain maximum conductivity.

IN-OUT SWITCH ACTION



Straight-line motion of the switch-arm provides positive opening and closing of the switch.



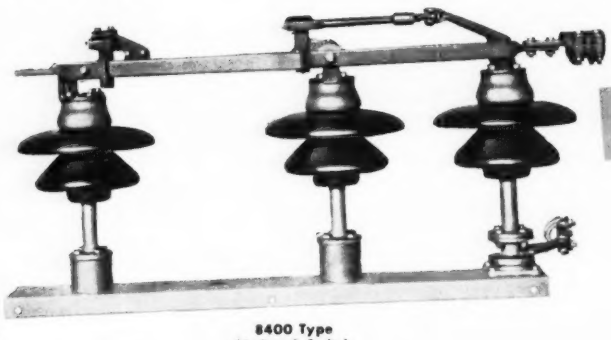
NEW OPERATING MECHANISM

A direct mechanical linkage. Uses no cams or rollers to deliver smooth powerful action. There is nothing to stick, bind or adjust.

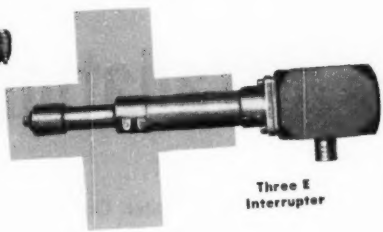
EQUIPMENT COMPANY

4000 EAST 116TH STREET · CLEVELAND 5, OHIO

Three E *Announces* a New Line



8400 Type
Air Break Switch



Three E
Interrupter

The New Three E Outdoor Air Interrupter Switches, because of their greater utility, will affect many savings.

The 8400 I Air Interrupter Switch as illustrated is our standard 8400 Type Air Break Switch to which a highly efficient Air Interrupter Unit has been added.

This switch therefore incorporates all of the excellent features of the 8400 type such as high pressure wiping contacts at both jaw and hinge ends, contact limit sleeves, NEMA standard B.I.L. or station post insulator stacks, to list a few.

THE AIR INTERRUPTER UNIT THAT HAS BEEN ADDED ENABLES THE SWITCH TO OPEN UP TO 600 AMPERES AT 46000 VOLTS AND UP TO 200 AMPERES UP TO 69000 VOLTS.

Listed herewith are some of the operations that can be successfully performed by this switch.

1. **Interrupting load currents.**
2. **Sectionalizing feeders and distribution circuits.**
3. **Interrupting magnetizing current of transformers.**
4. **Interrupting charging currents of busses, lines and cables.**
5. **Interrupting exciting current of feeder regulators.**
6. **Switching charging currents of capacitor banks.**

Several years of laboratory testing and actual service on large power systems has definitely proven the ability of this type Air Interrupter Switch to perform as noted above.

The Interrupter Unit is of the dry type employing no oil or other outside arc extinguishing medium. Interruption always takes place inside the arcing chamber of the unit. It is fast, (maximum of one cycle) and clean. There is no arcing or burning of contacts, and no resulting system disturbances.

The Interrupter Unit always opens last in the opening cycle of switch and closes first in closing cycle. Consequently interruption must always take place inside arcing chamber of the Interrupter Unit.

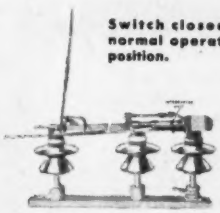
Combined with Power Fuses this type of switch provides an excellent means of circuit interruption plus fault and short circuit protection.

Bulletin 331 (just off the press) gives listings and detailed information. Listings are also given of 8900 IU and 8900 IL types of Air Interrupter Switches of the rocking insulator style. It is sent gratis.

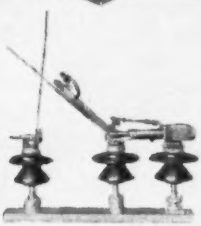
# of Outdoor Air Interrupter Switches

8400 I Type
Air Interrupter Switch

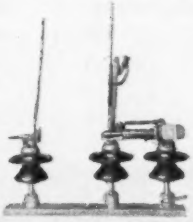
The New SWITCH EQUATION For COST CUTTING



Switch closed in normal operating position.

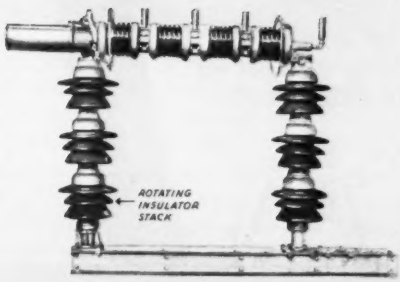


Switch opened to approximate tripping position of Interrupter Unit. Main switch contacts have already disengaged.



Full open position of switch.

We are also prepared to supply Air Interrupter Switches up to 115000 volts with interrupting rating up to 250000 K.V.A. A single pole of this switch is illustrated herewith. These switches can be either manually operated or spring trip on overload. For such applications we invite your correspondence.



ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

ELECTRICAL ENGINEERS EQUIPMENT CO. THREE MELROSE PARK ILL. U.S.A. "THE MARK OF QUALITY"

ANSONIA

Ankoseal

Control Cable

LOWER COST—YET YOU CAN...

...AND FORGET IT!

INSTALL IT...

CONTROL CABLES
Station control for Utilities
Traffic control for cities and towns
Machine control for industrial use

You really can forget all the customary causes of Control Cable trouble when you install **Ankoseal*. Its many advantages result from the new all plastic insulating and jacketing which provide the highest level of chemical inertness attainable.

As a result, your **Ankoseal* Control Cable installation will prove much more resistant over the years to flame, moisture, water and oil than the insulating materials of the cable you may be using now.

The extreme resistance to physical and chemical deterioration of **Ankoseal* Control Cable is your assurance of exceptionally long service life, so much so that in the ordinary rigors of daily service you can literally—*forget* it!

This Multiple Conductor Cable is available in a variety of standard sizes and construction. Custom-built cables can be provided for special purposes.

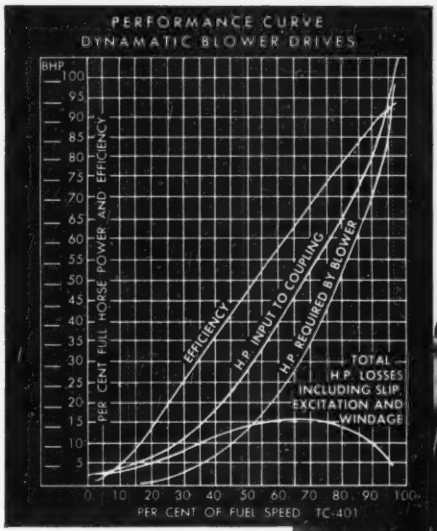
More detailed information, especially as to how **Ankoseal* Control Cable can improve your particular operation, will gladly be sent to any cost-conscious utility executive. Write us.

*Reg. U. S. Pat. Off.

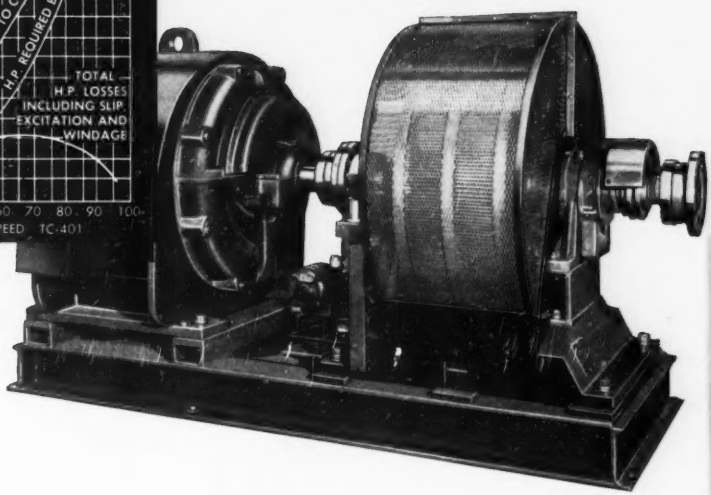
THE ANSONIA ELECTRICAL COMPANY

SUBSIDIARY OF NOMA ELECTRIC CORPORATION

ANSONIA, CONNECTICUT



EATON DYNAMATIC BLOWER DRIVES



Instantaneous Response to Speed Control

Dynamatic Variable Speed Couplings are ideally adapted to such applications as regulating air drafts in steam generating stations, power house fan drives, public utility induced draft fans, and forced draft fans. Controls can be made to change the output speed of the coupling and hold that speed constant. Response is instantaneous and load changes are closely followed. The speed range available is practically infinite, and can be controlled precisely from ten per cent speed up to full speed.

The performance curve above indicates the characteristics of Dynamatic couplings when driving fans or blowers. Fundamentally, all fans and blowers will have curves very close to the ideal curves shown in this figure. Note the desirable relationship between efficiency, horsepower input, and required horsepower. The horsepower losses indicated are normal for this type of application. Both air cooled and water cooled types of Dynamatic couplings are available, selection depending upon loads and type of service involved. The electric-slip coupling was developed and introduced by Dynamatic; this company has pioneered the use of electric-slip couplings in fan and blower drive applications. Write for illustrated literature.

EATON MANUFACTURING COMPANY • CLEVELAND, OHIO
ADDRESS INQUIRIES TO: DYNAMATIC DIVISION • KENOSHA, WISCONSIN

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

"Good neighbor" – good worker

The Westinghouse CSP Power Transformer has important new features:

Type TRO Thermal Relay that automatically integrates time with oil and copper temperature for accurate thermal control; fully accessible without breaking transformer seal.

Simplified URS Underload Tap Changer for reliable regulation and less maintenance.

Multi-Orifice "De-ion" Protective Link with extra-high interrupting capacity; easily replaced.

Mechanical Relief Device for dependable relief of internal pressures.

Standard Flexitest Control and Metering Instruments mounted on swinging panel.

Standard Plastic-Filled Control and Metering Transformers in air compartment.

Plus time-proved *Sealedaire Construction* for preservation of oil and insulation.

Substations can be "Good Neighbors"

Westinghouse CSP® Power Transformers can help you solve your substation real estate problems.

Small . . . trim . . . friendly in appearance . . . the Westinghouse Completely Self-Protecting Power Transformer has proved to be a "good neighbor" in even the best of neighborhoods. No longer is it necessary to have masses of steel, regulators, arresters, breakers, meters, fuses and other separate equipment of the open-type substation . . . because the CSP is a self-contained, single-feeder substation that occupies less than a third of the space required for old-fashioned structures . . . and can be landscaped into unobtrusive settings.

While you're securing substation sites in residential areas with the CSP . . . earning plenty of good will . . . this packaged Westinghouse unit delivers these additional advantages:

Simplifies Purchasing — Only one piece of equipment instead of many.

Cuts Installation Time and Expense — Move into position and connect. Steel work is not needed. Your substation can begin service right away.

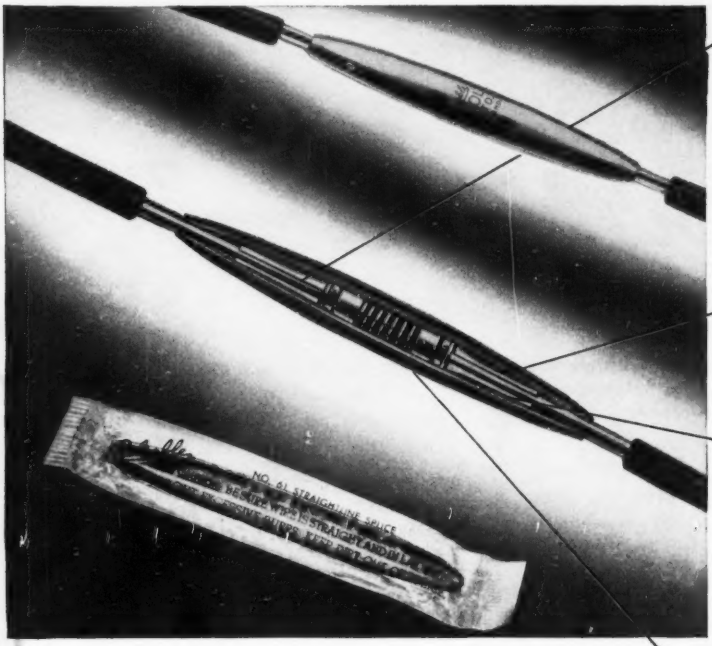
Completely Self-Protecting—(CSP)—Factory-co-ordinated protection of all components against lightning, short circuits and overloads.

Can Be Moved Easily if the center of load changes.

More than 500 of these architecturally designed Westinghouse CSP Power Transformers—handling over 800,000 kva—have been installed and put into operation since they were introduced in 1936. Westinghouse Unit Substations offer similar advantages for multi-feeder service. To get complete information, call your Westinghouse office, or write Westinghouse Electric Corporation, Transformer Division, Sharon, Pennsylvania.

J-70547

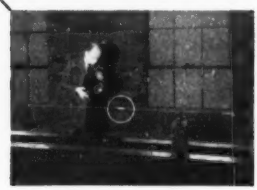
Accents on Accuracy



1. The shape and contour of hundreds of tiny points are closely controlled so they will bite sharply without gashing the wire.

2. Tapers of jaws and tubes, checked constantly during manufacture, are held to a small fraction of a degree, and their cooperating surfaces have almost mirror smoothness.

3. Physical limits on jaw material give full hardness after cold working, while preserving a tough grain structure. This hardness is greater than that of mild steel.



4. Accelerated vibration tests check the fine performance that results from accurate control and efficient design of these splices.

in the manufacture of

STRAIGHTLINE SPLICES

The phenomenal performance of Reliable Straightline splices doesn't just happen. It takes close control over many tiny details to provide a large safety factor beyond normal needs. This gives us assurance that wires will be held, not only in the laboratory where everything is right, but in the field where corrosion, light tensions, dirty wire, stretched wire or other unsatisfactory conditions may be encountered.

And remember — Reliable Straightline splices are now loaded with a neutral, all weather temperature grease which seals joints against corrosion. A tighter grip — important at very light sag tensions — results from this lubrication. To exclude dirt and grit, the splices are individually packed and sealed in sturdy plastic envelopes.

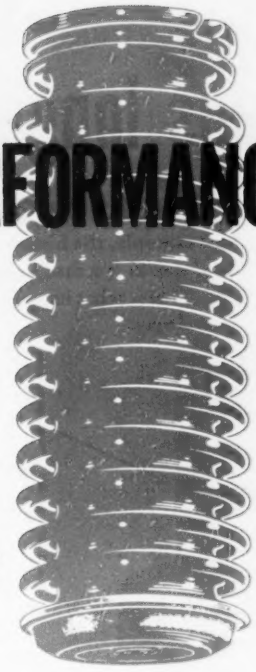
POWER-LINE CONNECTORS
AND
CONSTRUCTION SPECIALTIES

Reliable **ELECTRIC COMPANY**

3145 CARROLL AVENUE, CHICAGO 12, ILLINOIS

OVER 40 YEARS OF SERVICE TO THE UTILITIES

Do You Buy Sales talk or PERFORMANCE?



LAPP LINE POST

WE sell dependable performance. *Proven* performance. By now most companies have at least tried Lapp Line Posts, so the odds are you've got some Line Posts in service—maybe on what used to be a trouble-spot. It will be worth your while to study their performance record. We bet you'll find—as everyone who keeps performance records on Lapp Line Posts reports—that *lines on Lapp Line Posts have fewer outages, require fewer replacements and less maintenance than comparable lines on any other type of insulator.* Eighteen years of performance prove it. Now's the time to consider standardizing your transmission lines on Lapp Line Posts if what you want, in addition to endurance, economy, and functional beauty, is maximum performance. You can't afford *not* to.

PERFORMANCE IS PROOF

Lapp INSULATORS

LAPP INSULATOR CO., INC. • LE ROY, N.Y., U. S. A.

CB* plus F-3**
Means longer life at heavier loads

Anaconda has come to mean "keeping-ahead-of-the-parade." For example, the history of Type CB cable with resilient binder and F-3 alloy-lead sheath is a case in point. Its acceptance in the trade has been most gratifying. That is what happens in a company whose engineers are never satisfied with *anything*.

In 1939

Anaconda engineers introduced Type CB cable because ordinary paper-insulated cable wasn't good enough. Carbon-black paper removes oxidation products from the insulation, eliminates ionization discharges. These and other desirable properties increase insulation stability and assure longer cable life.

In 1944

Anaconda engineers added the resilient binder for they had found a way to reduce sheath strain during daily load cycles. Made of special carbon-black paper, it is strong yet resilient, results in lower stresses in the sheath due to cushioning effect, conducts radially and is fully adequate against magnetic forces.

In 1944,

because they know cable life often is shortened by premature sheath failure, Anaconda engineers gave this Type CB cable the amazing F-3 alloy-lead sheath. It is the best all-around alloy ever offered in the industry . . . resists slow-bending fatigue, creep (expansion), bursting, abrasion, vibration fatigue and does not age-harden . . . actually extends sheath life more than three times ordinary sheath. It has truly earned the name "indefatigable."

THIS COMBINATION permits heavier loads for longer life!

*CB – Carbon-Black, Trade Mark Registered U. S. Patent Office

**F-3 – Arsenic-Lead Alloy (U. S. Patents 2,300,788 and 2,374,755)

ANACONDA
from mine to consumer

ANACONDA WIRE & CABLE COMPANY

25 Broadway, New York 4, N. Y.

Cole Electric Co.

8439 Stellar Drive Culver City, Calif.

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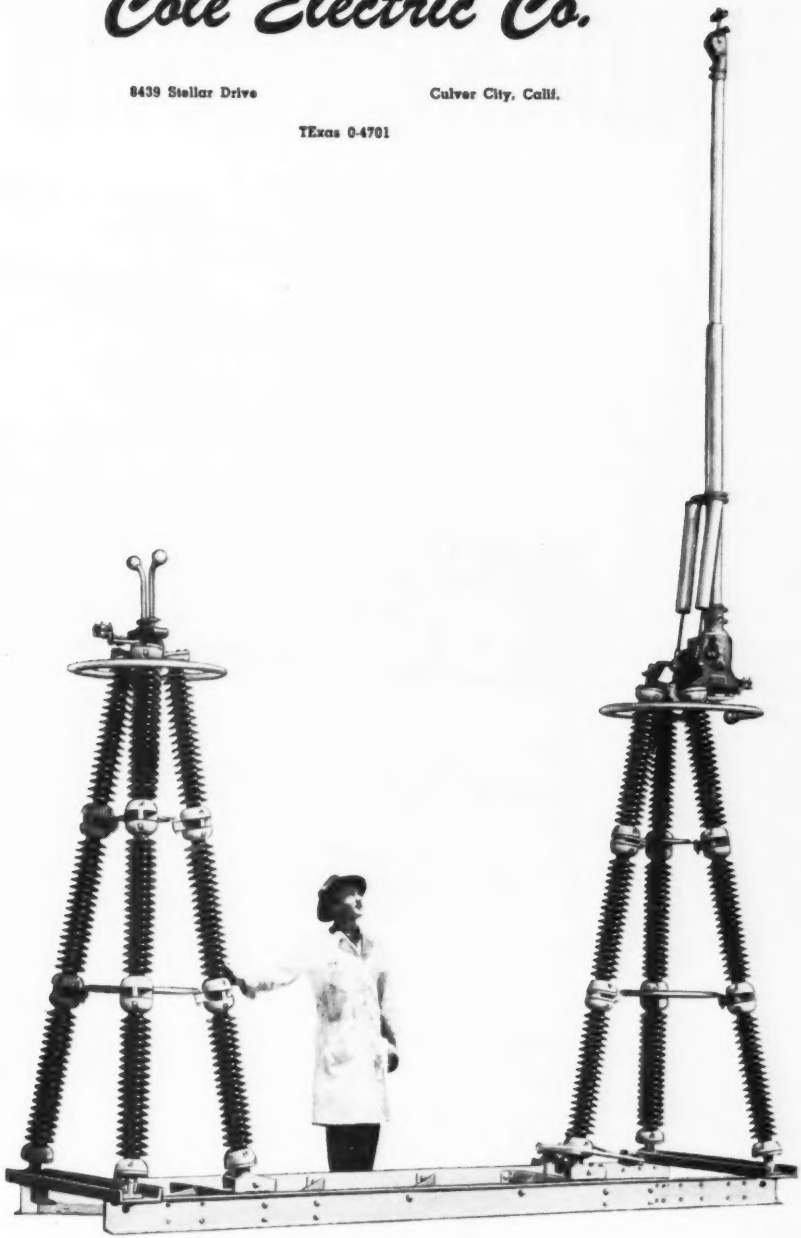
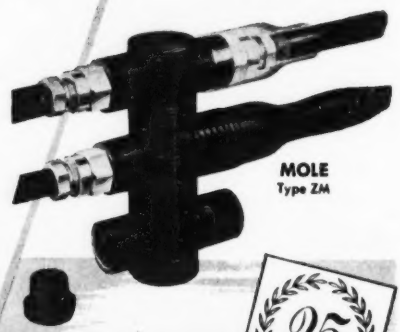


AIR BREAK DISCONNECTING SWITCH
230,000 Volts—1200 Amperes—Type MJ
Vertical Break—Three Pole, Single Throw
Group Operated
(One pole shown)

UNDERGROUND

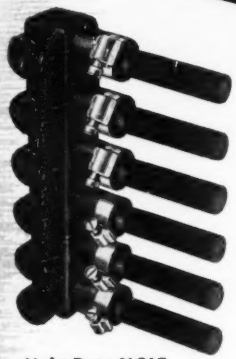
Burndy underground connectors have been time-tested for over a decade in actual service. Preferred because of their rapid installation, flexibility, and low cost. All pre-insulated to eliminate taping wherever possible. Ask for the Mole Line Catalog, or engineering assistance. BURNDY Engineering Company, New York 54, N. Y.
WESTERN BRANCH: Vernon 11, California.
CANADA: Burndy Canada Ltd., Toronto 8.



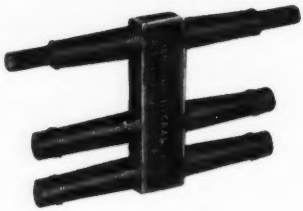
MOLE
Type ZM

25 YEARS OF SERVICE

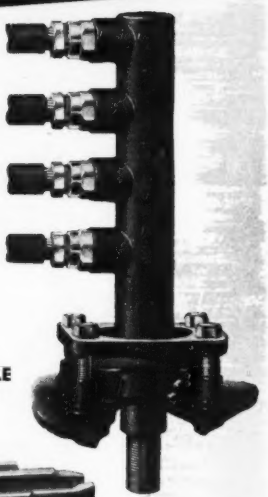
Connect with BURNDY



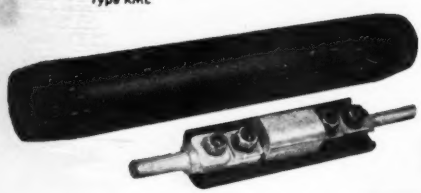
Light Duty MOLE
Type KME



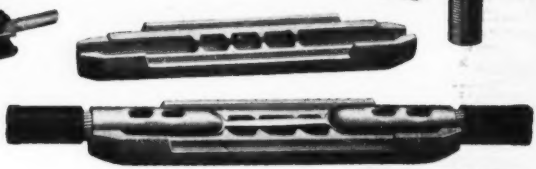
HYCRAB
Type YM



STUD MOLE
Type ZMLD



Replaceable Link MOLIMITER
Type LYM



LIMITER
Type YFS

YOU CAN BE SURE.. IF IT'S
Westinghouse

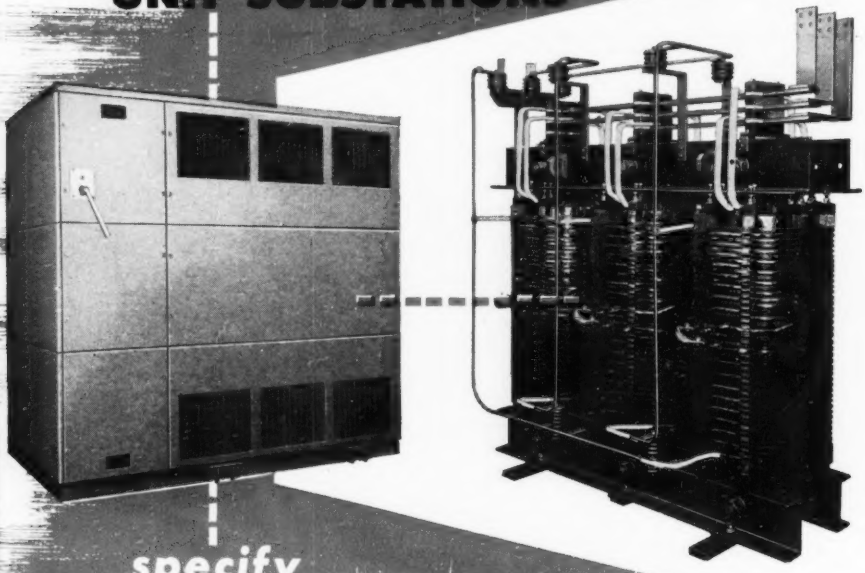
New Booklet

The complete line of Westinghouse Instrument Transformers—*the most complete line in the industry*—fully described and illustrated. Classified pictorial index makes it easy to select the transformers best suited to your needs. Get your copy from your Westinghouse representative, or write for Booklet B-4319, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70543

Westinghouse
INSTRUMENT
TRANSFORMERS

when buying

UNIT SUBSTATIONS



specify

Wagner TRANSFORMERS

AVAILABLE IN RATINGS FROM 100 TO 2000 KVA

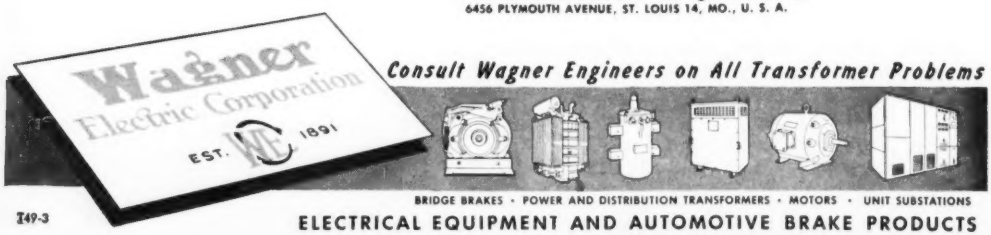
More than fifty years of transformer building experience has been incorporated in the design and construction of Wagner dry-type load-center transformers. Especially developed to meet industry's need for larger transformers for use in plant power distribution circuits, these units are compactly housed in neat, attractive enclosures, which can be arranged to include primary and secondary switchgear compartments to form readily accessible, closely-coupled unit substations. Complete enclosure of all equipment protects against accidental contact with live parts. Relatively light in weight, so they can be used in multi-story buildings, they are readily adaptable to any installation requirement.

Bulletin TU-56 describes in detail the transformers, the enclosures, the various types of incoming line sections available, and the optional equipment and accessories that can be furnished. Write for your copy today.

Wagner Unit Substation Transformers are also available in oil-filled and Noflamol types. Bulletin TU-181 gives information on the complete line of Wagner Power Transformers.

Wagner Electric Corporation

6456 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.



Consult Wagner Engineers on All Transformer Problems

BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

T49-3

SOAKING **FOR SEVEN YEARS**

...AND EFFICIENCY UNCHANGED

Do you have to fight wet locations? Here's a wire and cable insulation that brings peace! It's made of VINYLITE Brand Plastics—and has proved its efficiency, long service, and economy, after seven years of immersion in water!

When you need wire for wet locations, such as dairies, ducts under city streets, around garages or filling stations, outdoor phones . . . VINYLITE Brand Plastic insulation will provide the efficiency, economy, and durability you've been looking for.

For besides holding its excellent insulating properties after long immersion in water, VINYLITE Plastic insulation is highly resistant to greases, oils, ammonia, oxygen, alkalies, and most strong acids. Flexible and strong even at low temperatures, it permits smaller outside diameters for the same conductor sizes, allowing more conductors, or larger ones, in a given space.

VINYLITE Plastic insulation may be of non-flammable type, or slow burning. It comes in a wide variety of non-fading colors that will not scrape off. It is free-stripping and easy to pull through conduits or around sharp corners. It has made available *one* general purpose wire in place of several formerly needed for wet, dry, or oily locations—at the lowest cost. For full information write Dept. GT-28. Ask for booklet, "VINYLITE Plastic Wire and Cable Compounds."

Data Courtesy Crescent Insulated Wire & Cable Co., Trenton, N. J.

Immersion Tests on #14 Building Wire insulated with VINYLITE Brand Plastics

S.I.C.* at 23 deg. C.

Days Immersion*	Sample #1	Sample #2	Sample #3
Orig.	4.65	5.26	5.45
14	4.85	5.33	5.67
102	4.98	5.32	5.64
255	4.75	5.12	5.49
549	5.58	5.90	6.44
750	5.70	5.96	6.62
1000	5.44	5.56	6.04
1250	5.84	5.74	6.38
1568	5.59	5.61	6.42
2550	5.75	5.33	6.23

*In fresh water tanks at constant temperature.

Vinylite BRAND **PLASTICS**

BAKELITE CORPORATION

BAKELITE CORPORATION, *Unit of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

SAVE 22% with LOCKE'S NEW HI-GRIP Guy Clamps

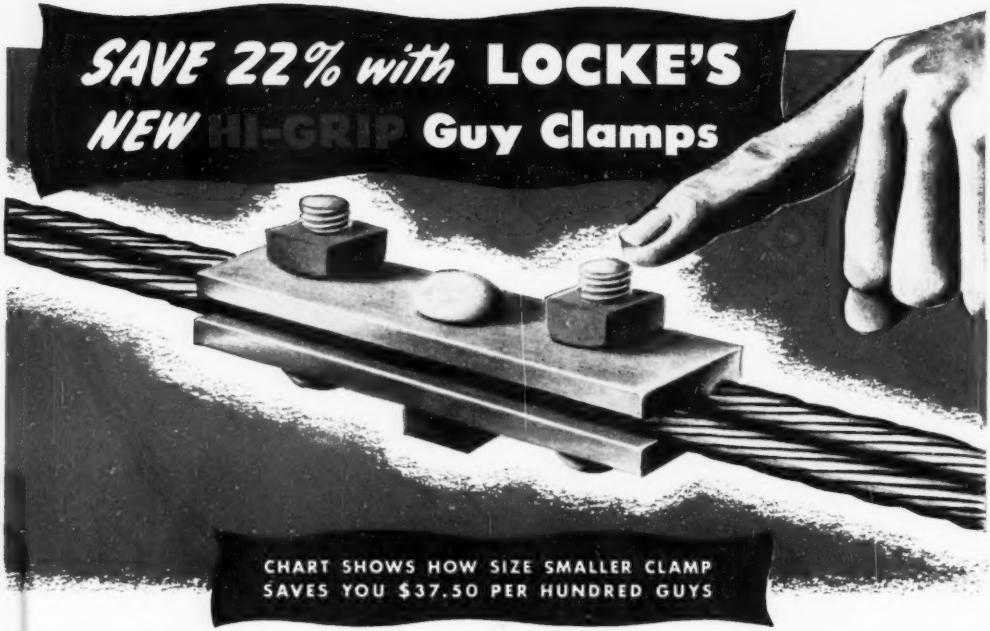


CHART SHOWS HOW SIZE SMALLER CLAMP SAVES YOU $37.50 PER HUNDRED GUYS

SLIP STRENGTH IN POUNDS
(NO SLIPPAGE OF STRAND IN CLAMP)

	3/8" HS 10,800 LB.	11,000
RATED STRENGTH OF STRAND	10,000	
	No. 6461 REGULAR CLAMP	No. 6450-HG HI-GRIP CLAMP

As the chart shows, a regular No. 6461, 3-bolt heavy Guy Clamp on 3/8" HS guy wire has a slip strength of about 92% of the rated breaking strength of the wire.

BUT, a No. 6450-HG, 3-bolt light HI-GRIP Guy Clamp on the same wire has a slip strength *greater* than the rated breaking strength of the guy wire.

The smaller HI-GRIP clamp holds better than its bigger brother—yet COSTS 22% LESS!

If you adhere to standard practice, you use four No. 6461 regular guy clamps per guy (with one insulator). In such places use Locke HI-GRIP Guy Clamp No. 6450-HG and save $37.50 per hundred guys.

SPECIAL LUBRICANT AND HIGH STRENGTH BOLTS GIVE HIGH SLIP STRENGTH TO HI-GRIP GUY CLAMP

As the chart shows, Locke's new HI-GRIP Guy Clamp gives you slip strengths far greater than regular guy clamps *without damage to guy wires.*

These increased slip strengths are obtained by using high strength bolts and treating the nuts of the bolts with a special lubricant. This lubricant allows the halves of the guy clamp to be drawn together more tightly using no more torque than is normally applied to regular clamps.

All Locke Guy Clamps are available in the HI-GRIP type, and all show similar savings. Get all the facts in the Locke TECH-REPORT on HI-GRIP Guy Clamps now available. Call your Locke representative or distributor, or write direct.

LOCKE
INCORPORATED
BALTIMORE, MARYLAND

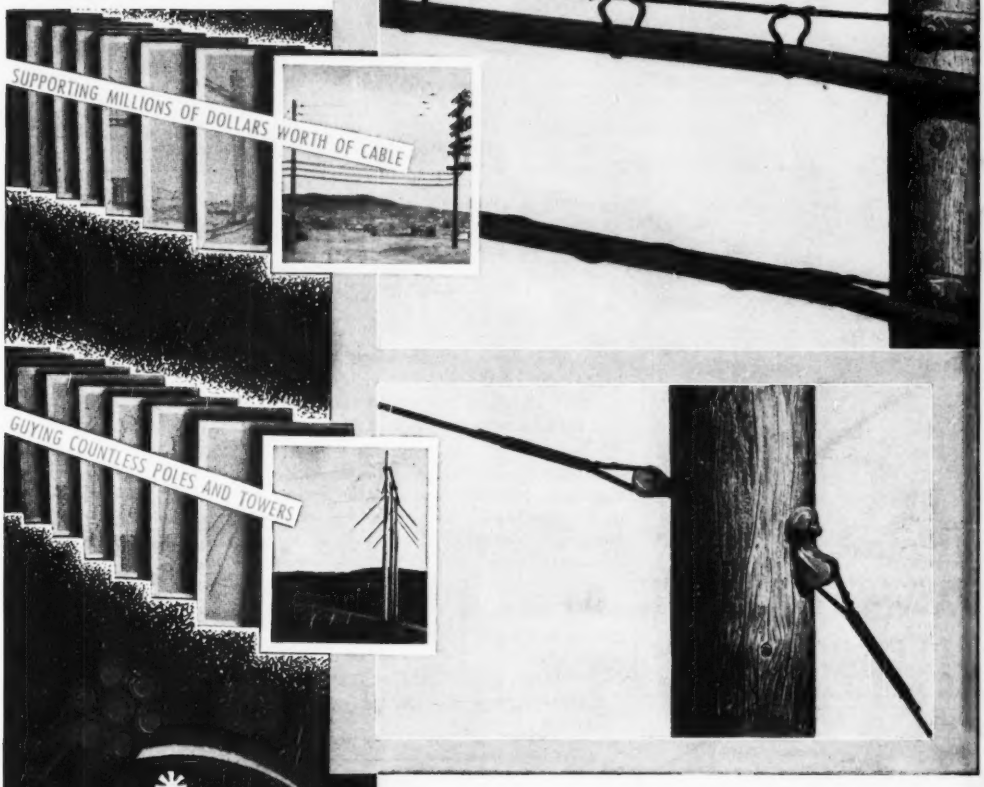
Before you buy STOP! See what Locke's Got!

Copperweld NON-RUSTING* Strand

TRADE MARK

Has Proved Its Value

ON THOUSANDS OF MILES OF LINES



* Copperweld Strand is Permanently Protected against Corrosion. Each Wire has a thick Copper Covering inseparably Molten-Welded to a strong Alloy Steel Core.

The permanence of Copperweld Strand, demonstrated in severe service during the past thirty years, has earned the confidence of the entire industry. For long-lasting guys and messengers, you can't beat this reliable, time-tested strand.

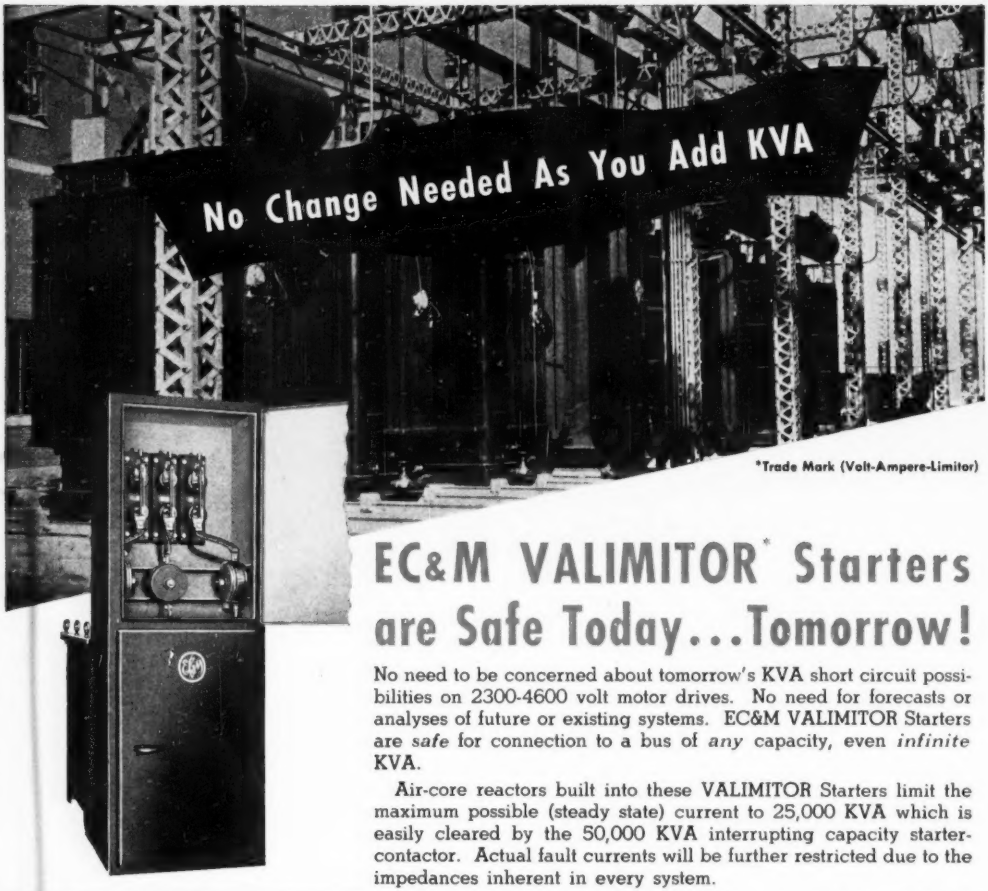
And it's sound economics to use non-rusting Copperweld Strand because you save by eliminating replacement costs. With Copperweld you don't need to buy oversized strand as a protection against later loss of strength caused by rust. Copperweld Strand can't rust—its original strength is permanent.

Write for Engineering Data

COPPERWELD STEEL COMPANY

GLASSPORT, PA.

SALES OFFICES IN PRINCIPAL CITIES



*Trade Mark (Volt-Ampere-Limitor)

EC&M VALIMITOR* Starters are Safe Today...Tomorrow!

No need to be concerned about tomorrow's KVA short circuit possibilities on 2300-4600 volt motor drives. No need for forecasts or analyses of future or existing systems. EC&M VALIMITOR Starters are *safe* for connection to a bus of *any* capacity, even *infinite* KVA.

Air-core reactors built into these VALIMITOR Starters limit the maximum possible (steady state) current to 25,000 KVA which is easily cleared by the 50,000 KVA interrupting capacity starter-contactor. Actual fault currents will be further restricted due to the impedances inherent in every system.

When a fault occurs, there's *nothing to replace*. And the thermal effects and electro-magnetic forces clear back to the power source are limited to safe values by EC&M VALIMITOR Starters. For a *permanent* solution, simply tell us the motor characteristics (HP, voltage, phase and frequency) and type of motor.

VALIMITOR STARTERS give *Complete* Protection.

VALIMITOR Starters

for **2300—4600 volt** squirrel-cage, synchronous or wound-rotor motors

SHORT CIRCUIT Protection—Fault currents limited to 25,000 KVA (steady state) current on *any* system. EC&M Type ZHS Contactors (50,000 KVA interrupting capacity) clear such faults easily.

OVERLOAD Protection—Magnetic Overload Relays protect against failure to start, single phase operation and sustained overloads when the motor is operating—Trip instantly on fault currents.

LOW VOLTAGE Protection is normally provided by a momentary-contact start push button. Time-delay low voltage protection can be supplied where line voltage dips momentarily. Starters can also be arranged for low voltage release. Automatic or magnetic re-set of overload relays is supplied as needed to meet these conditions.

CUSHIONED STARTING—Full Voltage VALIMITOR Motor Starters inherently provide a degree of reduced voltage starting without the use of additional equipment. VALIMITOR's smoother start and lower inrush current may save the extra cost of the more expensive reduced-voltage starter. When the motor is up to speed, VALIMITOR Starters function like any standard full voltage starter.

Write for Complete Facts—Ask for No. 23 Accelerator Bulletin

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET ★ CLEVELAND 4, OHIO

OZALID copies save time, money, labor!

1. Duplicate file cards, letters, reports, drawings in *seconds!* Just place them against one of the many types of Ozalid sensitized materials and feed them into the Ozalid machine. Positive copies are delivered dry and ready for use. Make 1 copy or 1000! Ozaprints can be made in different colors, against different colored backgrounds, on different materials.

2. Translucent originals will eliminate any intermediate steps. You get Ozalid copies directly . . . no special "masters," no time-delaying machine set-up. Stationers and printers will help you save time and money by supplying all business forms (even file cards, business-reply cards and letterheads) on translucent stock, now.

3. Imagine asking for "ten copies in three minutes" . . . *and getting them!* Give your copy-typists more important work to do by letting the office boy operate the simple, speedy Ozalid machine! A fuller explanation of Ozalid awaits your request. Ask for it today. Or find your Ozalid distributor in the classified telephone book.

Don't copy . . . use OZALID

A Division of
General Aniline & Film Corporation
"From Research To Reality"

DEPT. NO. 143

OZALID **Johnson City, New York**

Gentlemen: Please send free copy of "The Simplest Business System" . . . fully explaining use of translucent papers and Ozalid Streamliner.

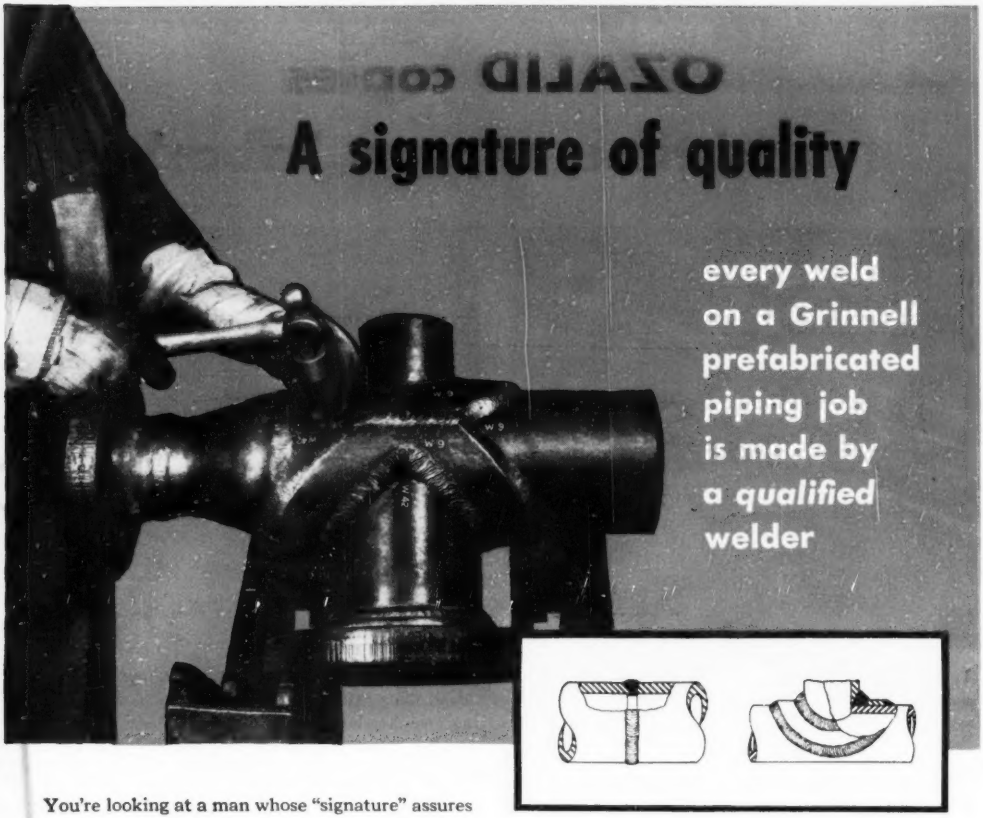
Name _____ **Position** _____

Company _____

Address _____

_____

Ozalid in Canada—
Hughes Owens Co., Ltd., Montreal



You're looking at a man whose "signature" assures quality welding of piping. He's a Grinnell welder and, as every Grinnell welder, he is qualified by Grinnell according to a procedure which conforms to A.S.M.E. Boiler Construction Code, Section 9. After qualifying, he is given a number which he "signs" adjacent to each weld he makes.

Quality welding is only one of a long chain of responsibilities assumed by Grinnell on every prefabricated piping job . . . from the interpretive engineering to the on-time delivery of the fabricated piping. Such responsibility requires facilities for metallurgical research and testing, comprehensive knowledge of state laws and industry codes, and a complete familiarity with insurance company requirements for fabricated piping.

The fabrication of piping for today's high pressure, high temperature or corrosive services is a job for experts. It's a job for Grinnell prefabricating plants because Grinnell has the modern equipment and methods, and the skilled personnel which enable them to assume total responsibility for the job.

99 YEARS PIPING

GRINNELL

Grinnell Company, Inc., Providence, Rhode Island. Branches: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston Long Beach • Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

AVAILABLE SOON

. . . reserve your copy now

BTC's new catalog of Drop Forged Hi-Line Hardware will soon be coming off the press. The first edition to appear since the war, it contains valuable information you'll want to have on hand for ready reference—pictures, blueprints and complete specifications on BTC's entire line of Drop Forged Steel, Aluminum and Bronze Hi-Line Hardware.

This 40-page BTC catalog will be sent to you without charge by the company that pioneered the first and only full line of standard drop forged high-line hardware. Simply fill in and mail the coupon below — but do it now, so that your copy can be mailed when it's ready.

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CORTLAND, NEW YORK
Metal Products Manufacturers for over 100 Years

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CORTLAND, NEW YORK

Please reserve my copy of the new BTC hi-line hardware catalog.

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COMPANY _____

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CITY _____ ZONE _____ STATE _____

PROOF - *not Guesswork*

Makes FWD America's Foremost Heavy-Duty Truck

Here's actual operating proof by one of the nation's leading utilities. This FWD line construction unit is speeding around a sharp curve to location. Yes — with power on all four wheels, FWDs give you extra traction to take tight turns safely. You know this before you buy, because FWD Built-to-Code Units are scientifically tested to speed over a 100-foot unbanked circle without skidding. *No wonder over 200 of the nation's top utilities use FWDs — with individual fleets up to 192 units!*

WHAT FWDs DO ON THE PROVING GROUND
1 Highball over hilly curved roads!
2 Slog thru mud — up to the bumper!
3 Speed over 100 ft. unbanked circle!
4 Twist over ditches —18 inches deep!
5 Drive up 6% grade thru 3-ft. of sand!
6 Climb 70% grade from dead stop!
7 Climb 8-in. beam from standstill!
8 Drill pole holes to prove equipment!
9 Speed safely over level highways!

This is FWD's proving ground. This is your assurance that the FWD you select has the stamina to insure long life without expensive mechanical breakdowns.

An FWD speeds over the 100-ft. circle at the proving ground. For all the facts about FWD Built-to-Code Units, see your Graybar distributor, or write FWD.

An Invitation To Truck Buyers

We invite you to watch FWDs pass a series of rigid performance tests. Ask your FWD distributor to arrange your visit to our plant. Or — if you can't get away, ask him to show you the movie, *The FWD Story*. In either case, you will see for yourself how FWD trucks can help solve your heavy-duty trucking problems.

Marion A. Olson
President
The Four Wheel Drive Auto Company

THE FOUR WHEEL DRIVE AUTO COMPANY
Clintonville, Wis. • *Canadian Factory:* Kitchener, Ontario
FOUR AND SIX WHEEL DRIVE TRUCKS

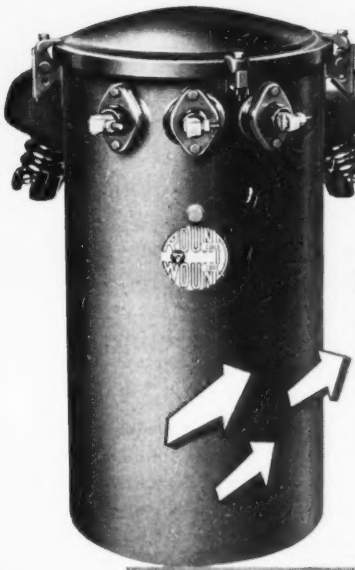
U-1

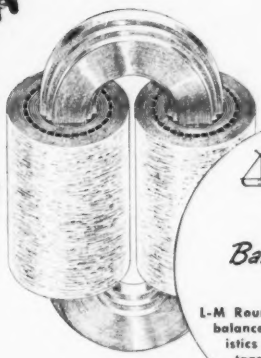
America's Foremost Heavy-Duty Truck

Cut failures... cut costs... with these features

of

L-M ROUND-WOUND TRANSFORMERS





High Short-Time Overload Capacity

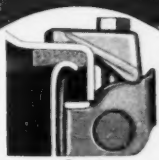
Stepped core cross section provides oil passages between core and coil; these and the long round coils expose more surface to the oil, assuring better cooling.

High Impulse Strength

Coils are wound round right onto the core—no need to mallet coils into shape. Round coils can be wound tighter with better insulation distribution and improved impregnation, assuring higher average impulse strength.

Balanced Performance

L-M Round-Wound design provides balanced performance characteristics with their many advantages including better regulation, and high short circuit strength.



Quality Craftsmanship

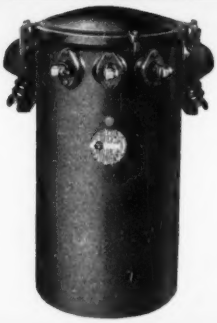
Sealed tank construction, an L-M "first", is one of many quality construction features that assure long life for L-M Round-Wound transformers.

L-M Round-Wound transformers have a record of remarkably few failures—from all causes including lightning. This fact, together with their low operating cost, makes Round-Wounds a most desirable investment for both new construction and replacement of old, high-cost equipment. Want more information? Ask the L-M Field Engineer, or write Line Material Co., Transformer Division, Zanesville, Ohio.

LINE MATERIAL... TRANSFORMERS

Complete Coordinated Equipment for All Distribution Requirements

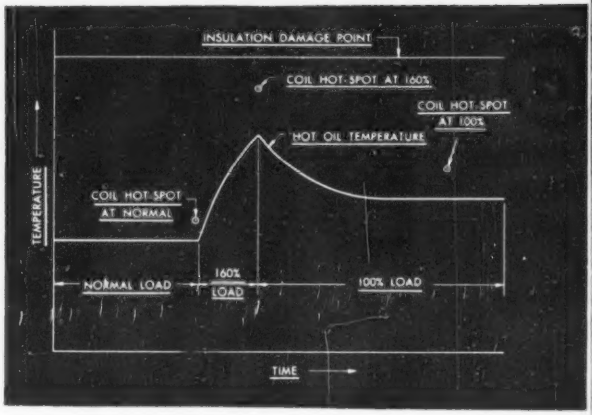
high short time overload capacity because L-M "ROUND-WOUNDS" *have built-in cooling*



Obviously no transformer that develops hot spots because of insufficient coil ventilation will take much of an overload, even for a comparatively short time.

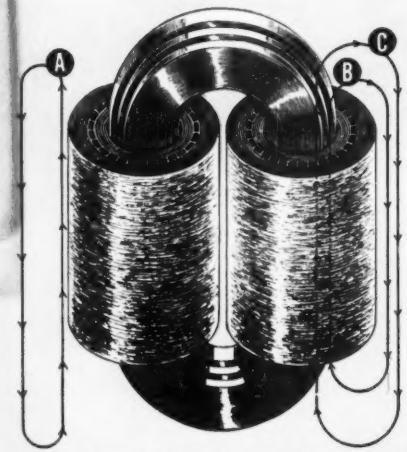
So, to assure real short-time overload capacity, L-M engineers designed a core which has inherently good coil ventilation characteristics. That's what we mean by a cooling system.

No—we aren't recommending Round-Wound 5 kva's for a 10 kva job! But we *do* say that you can expect long life, with an extra margin of short time overload capacity, because of the superior coil cooling of the Round-Wound design.



Typical time-temperature curve for Round-Wound transformers.

The arrows in the illustration below show the flow of cooling oil



Arrows show oil circulation around and through the long round coils, and between core and coils. Exceptional cooling characteristics inherent in the L-M Round-Wound design assure you of unexcelled short-time overload capacity.

As the illustration shows, L-M Round-Wound design provides long round coils which expose more surface (A) to the oil than do shell type transformers. What's more, the Round-Wound design provides oil ducts between the cruciform core and the coils (B) to cool the inner windings. And in the larger sizes we build oil ducts right into the coil windings (C) for still more oil circulation.

How are you going to develop critical hot spots with that kind of cooling? Temperature gradient between windings and top oil remains low, and insulation is protected against damage under severe loading conditions.

Exceptional coil cooling results in high short time overload capacity—one of the several fundamental "Balanced Performance" characteristics found in all L-M Round-Wound transformers. Want more details? Ask the L-M Field Engineer or write Line Material Company, Transformer Division, Zanesville, Ohio.

ROUND COILS WOUND CORE

LINE MATERIAL Transformers

Complete Coordinated Equipment for All Distribution Requirements

L-M's new Spherolite, Jr.

for better neighborhood lighting at an economical neighborhood price!

The new Spherolite Jr. offers the many advantages of an enclosed luminaire, with shielded light source and good directional characteristics. Its low original and operating costs make it most suitable for residential areas with narrow streets and wide spacings.

Some Important Features

Narrow beam for increased lighting of streets and shielding of residences.

Concentration of light in the main zone, with maximum intensity of eight times the bare lamp value. Main beam at 78° in vertical provides high visibility at wide spacings.

Choice of IES type II or 4-WAY® light distribution, as shown at left. Refractors easily attached to the specular Alzak reflector with the L-M stainless steel V-Band, which is a positive gasketless seal against bugs, dust, and water. Thus refractors are easily changed in the field, adding flexibility and reducing inventory required for maintenance.

Interchangeability to meet traffic or population growth

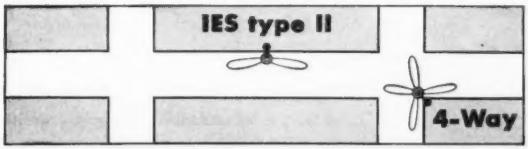
Spherolite Jr. fits the same wide variety of L-M-standardized heads as do L-M's smallest open reflectors and largest enclosed luminaires. Thus changing luminaires usually means simply unlatching one and latching on the replacement—offering a substantial saving in time and material.

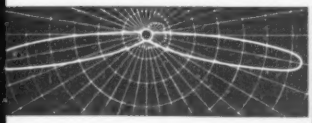
The REFLECTOR-REFRACTOR® assembly illustrated fits any of these: low voltage multiple head; high voltage porcelain head; and, with modified reflector collar, metal series heads up to 5000 volts. The type B head shown is available for either inner or outer wiring, and in either pendent or side mounted style.

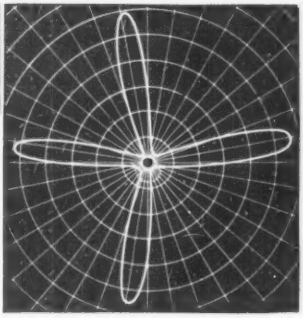
Get complete information on Spherolite Jr. and other equipment and L-M Street Lighting Engineering Service ***from the L-M Field Engineer; or write*** **Line Material Co., Milwaukee 1, Wis.**

® Reg. T. M., Holophane

Two types of light distribution







Choice of two Holophane® refractors which provide either the IES type II pattern shown above, or the 4-Way pattern for intersections at right.

7132

LINE MATERIAL Street Lighting

Complete Coordinated Equipment for All Distribution Requirements

Have you seen L-M's latest street lighting development?

the revolutionary new

AUTOLATCH

...the first truly automatic pressure latch!

No gaskets! yet it's bug-proof and water-tight

Service from the ground! any standard hook stick will work

Trouble-free maintenance! Autolatch cuts your lamp maintenance time and costs

Now on the L-M Spherolite . . . soon on Spherolite Jr.

At no increase in price!

L-M's revolutionary new Autolatch provides a minimum of 40 pounds pressure to hold glassware tightly to the reflector. Spring pressure on both latch and hinge sides. Uniformly smooth-surfaced glassware edge fits tightly against machined reflector edge. Bugs, dust, and water stay out. Yet the latch is easy to open. To close, you just swing the glassware back up, and the Autolatch snaps shut—tight.

The Autolatch is just another advantage of L-M's highly efficient Spherolite Luminaire. For complete details of Spherolite, its adaptability to either incandescent or mercury vapor, and the Autolatch, ask the L-M Field Engineer or write Street Lighting Division, Line Material Co., Milwaukee 1, Wisconsin.

2

3

4

5

1. Front view of the revolutionary new Autolatch. Works easily, permits service from the ground, cuts maintenance, no gaskets are necessary—and there's no increase in price!

2. U-shaped metal end fits right under the Autolatch. Tilting the stick outward slightly releases the latch, and the glassware swings down **(3)**. (The U-shaped attachment fits the reverse end of your regular lamp stick).

4. Glassware is easily unhooked and replaced. Precisely engineered parts fit smoothly. No gaskets. No screws! It's a 3-second job with the Autolatch—and **(5)** swinging up the glass snaps the Autolatch shut.

LINE MATERIAL Street Lighting

Complete Coofdinated Equipment for All Distribution Requirements

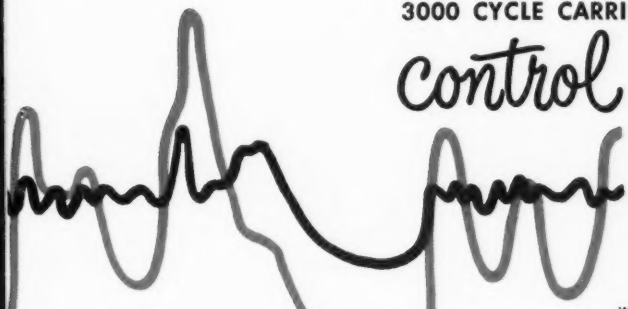
7381

Cut load peaks... with "wired radio"

L·M

3000 CYCLE CARRIER CURRENT

control



Street lights, sign and show window lighting

Off-peak water heating

Airport lighting

Water supply and irrigation pumps

Supervisory control, sectionalizing or capacitor switching . . . many other uses

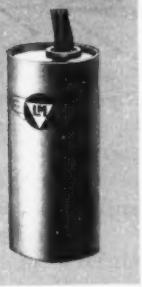
ELEVEN YEAR SERVICE RECORD SHOWS L-M "WIRED RADIO" CONTROL PRACTICAL, ECONOMICAL, TROUBLE-FREE

Just push a button—and "Wired Radio" sends a 3000-cycle carrier current signal over your entire distribution system. Automatic coding selects any one of six types or groups of loads and promptly turns it on or off. No clocks, no pilot wires, no tubes, no trouble, no interference. In fact, it's practically perfect!

It's a great aid, too, in cutting costs and building revenue. "Wired Radio" cuts both generating and distribution peaks, releasing system capacity for additional loads. It permits greater saturation of water heaters, which can be turned on in any desired group during short or long off-peak periods, or dumped quickly in emergencies. It gives you the full economy of multiple street lighting.

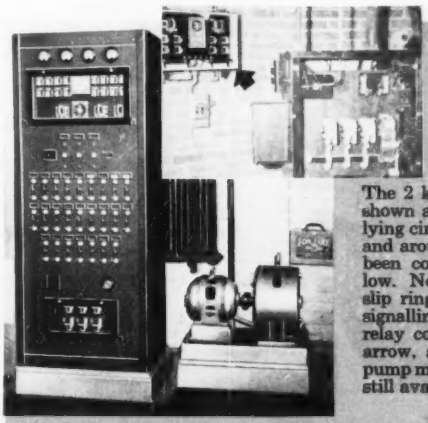
For over 11 years "Wired Radio" installations have been setting records and making money for users. Tests show better than 99.9% correct operation. Many 8-10-year old installations in large and small cities, with minimum maintenance. Pays for itself in 3 to 5 years.

No wonder its recent acceptance by major utilities has been almost phenomenal. Why not ask the L-M Field Engineer to discuss its application to your system? Or write "Wired Radio" Division, Line Material Company, East Stroudsburg, Pa.



***New* Simple, Economical Single Group Receiver**

In addition to the standard multiple group receiver, L-M has developed this new single group unit for use on smaller systems and to add an extra group on larger systems.



***for 11 years Sioux Falls* has used "Wired Radio" to control city water pumps and outlying street lights**

The 2 kva 3-group 25-control transmitter shown at left controls street lights in outlying circuits and 16 water pump motors in and around Sioux Falls, S. D. Service has been continuous; maintenance extremely low. No tubes to burn out, no brushes or slip rings, equipment operates only while signalling. Upper photo shows the coded relay control unit (receiver) indicated by arrow, and starter on one of the 50 HP pump motors. Nine positions are still available for future uses.

LINE MATERIAL "Wired Radio"

Complete Coordinated Equipment for All Distribution Requirements

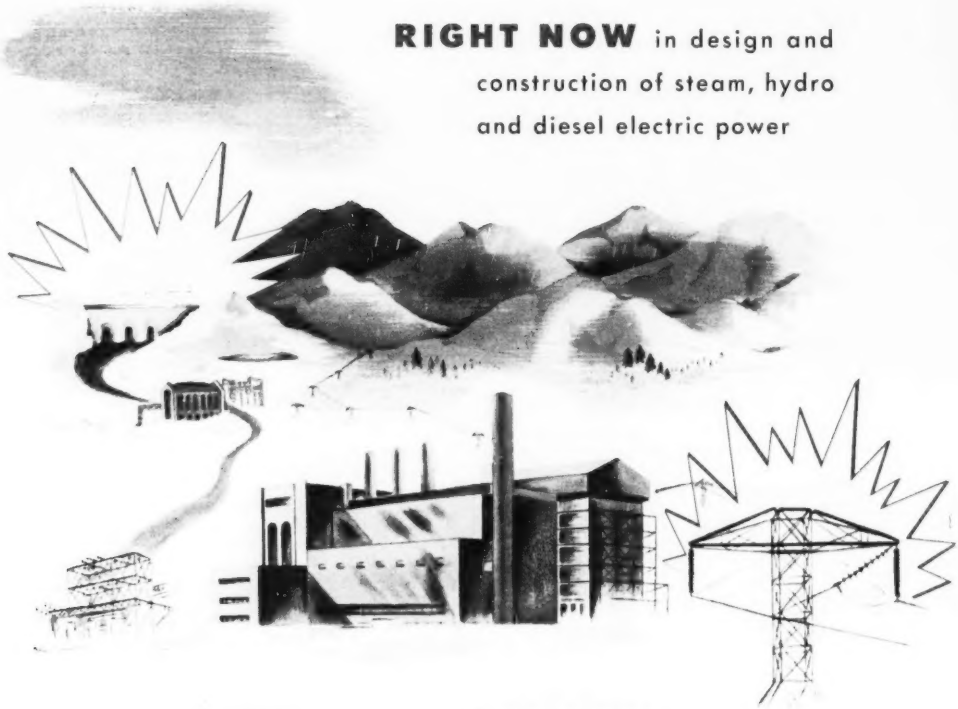
WIRED RADIO CONTROL

LM

7128

"Half a million Kilowatts of know how"

RIGHT NOW in design and construction of steam, hydro and diesel electric power



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BECHTEL

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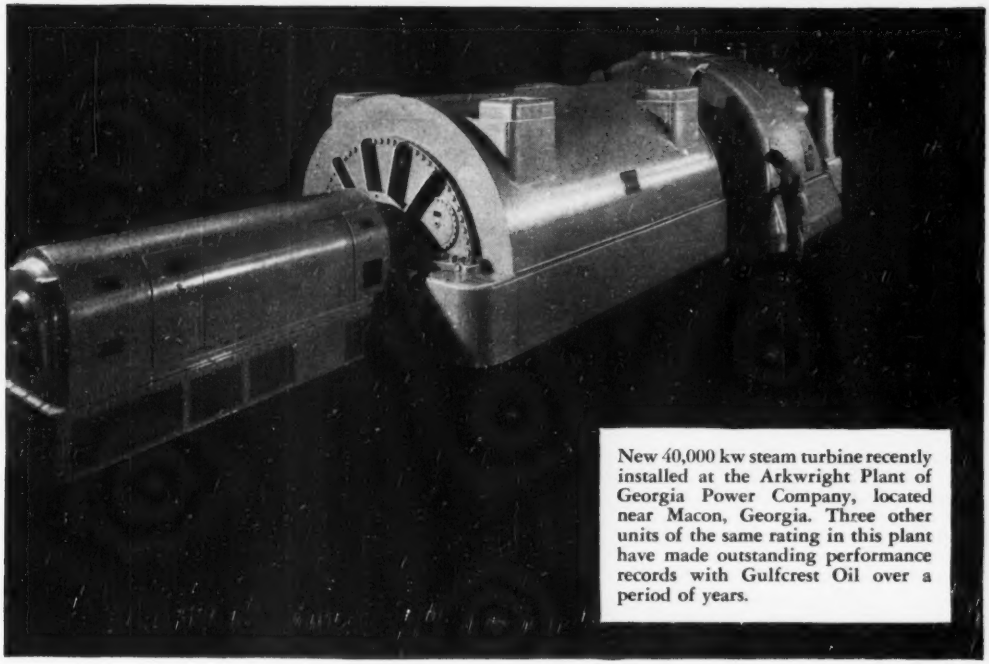
PLANNING TO COMPLETION

ECONOMIC STUDIES • PROCESS DESIGN • ENGINEERING • PURCHASING • CONSTRUCTION



New 40,000 kw steam turbine recently installed at the Arkwright Plant of Georgia Power Company, located near Macon, Georgia. Three other units of the same rating in this plant have made outstanding performance records with Gulfcrest Oil over a period of years.

GULFCREST OIL SELECTED

BY GEORGIA POWER FOR ANOTHER 40,000 KW TURBINE

Another big turbine gets the safe, sure, long-lasting protection of Gulfcrest, the world's finest turbine oil!

Another case, too, where outstanding performance in other turbines operated by the same utility led to the selection of Gulfcrest Oil for the new unit!

Extra refining makes the difference! After the carefully selected crude oil used in Gulfcrest goes through the major refining methods, it is then supperrefined by the Alchlor Process.

More than 15 per cent of the oil is discarded by the Alchlor Process—this 15 per cent contains the hydrocarbons most apt to oxidize and form sludge, emulsifiers, and harmful acids.

That's why Gulfcrest is incomparably pure—why it gives outstanding performance, and lasts indefinitely. Send the coupon below for a booklet which gives you the complete facts on this superior oil.

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Gulf Oil Corporation · Gulf Refining Company EW
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Please send me, without obligation, a copy of your booklet "Gulfcrest Oil for Steam Turbine Lubrication."

Name.....

Company.....

Title.....

Address.....

That new, big modern

Elliott motor - makes

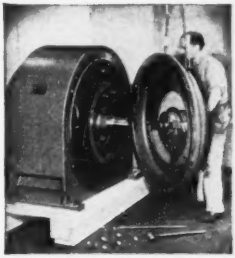
Elliott

take-downs quick and simple!

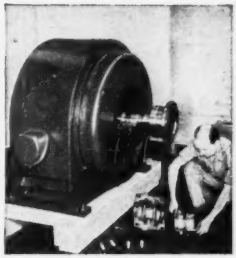
How to pull out a rotor

NO NEED FOR SPLIT BRACKETS OR MOVING THE MOTOR. On the free end of the motor (opposite the driven element) back off the bearing bracket cap screws, hook in a hoist, and start sliding complete bracket, with bearing assembled, off the rotor shaft.

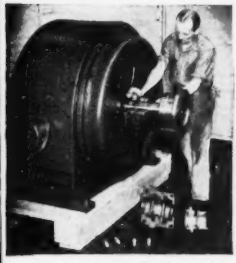
That solid bracket, like the motor frame, is of steel, and a good 30 per cent lighter than a cast iron bracket of similar size. So . . .



. . . it's a lot lighter to handle, and can be easily swung off and out of the way. That end of the rotor is then supported by the stator core, and the motor is entirely open at that end. Next . . .

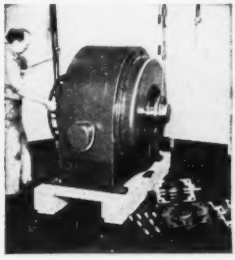


. . . start on the other (coupling) end of the motor, disconnect the coupling, take out the four cap screws and bolts holding the bearing cap, and also the top half of the split sleeve bearing. Then . . .



. . . apply a sling to the shaft, lifting it a trifle to take the weight off lower half of bearing. Roll lower half around to top of shaft, lift it off, and back off cap screws holding the bottom half of bearing housing...

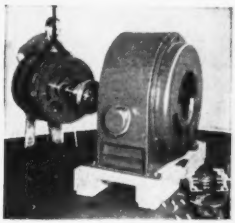
. . . which can then be rolled out, leaving a hole in bracket large enough to permit withdrawal of coupling, in most cases, without removing it. You don't touch bearing bracket on this end. Then . . .



. . . attach a sling under the exposed shaft on the end of the motor, from which bracket was removed. Push back outer part of coupling and place another sling. Give it a bit of lift, and the rotor will then swing free. Start pulling it out. Next . . .

. . . transfer sling on coupling after moving shaft enough to insert screw eyes for the hoist hooks, in the tapped holes usually provided in the coupling for pulling off coupling half. This permits of further withdrawal of the rotor. Finally . . .

. . . transfer the rope sling to the center of the rotor, so that it balances in the sling. Swing the rotor out still farther, unhook the sling from the coupling end of the shaft . . .



. . . pull the rotor clear out. That's all there is to it—and you've done the job without shifting the motor or taking off the coupling — *hitting a new low in motor maintenance.*

TO REASSEMBLE, reverse the steps above except in replacing front bearing bracket assembly, rotate bracket 180 degrees to hold oil ring so it will clear shaft — push on and rotate bracket back to correct position.

How to replace a bearing

Take off two cap screws, two bolts, and two dowels, and lift off the bearing cap. Pull out two small dowels and take off the upper half of the split sleeve bearing. Then . . .

. . . with a pry bar under the boss on shaft end, raise shaft enough to take weight off lower half of bearing, roll it round to top of shaft, take it out from under the oil ring.

To replace a bearing on coupling end see photos 2 and 3 in above sequence on pulling out a rotor. L-782b

150 to 2000 hp—four to fourteen poles—drip-proof, splash-proof, enclosed separately (force) ventilated, enclosed self-(pipe or base) ventilated, enclosed self ventilated with built-in coolers. Write for Bulletin PB-7000-2. Address Dept. ER.

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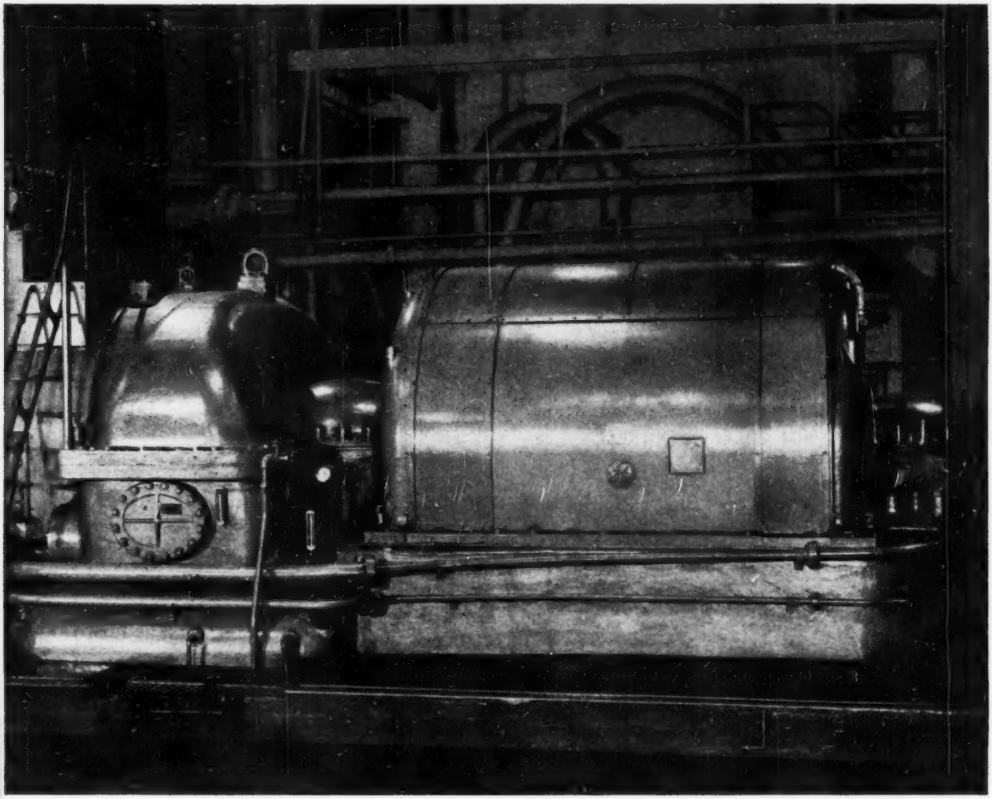
Electric Power Dept., RIDGWAY, PA.

Plants at: JEANNETTE, Pa. • RIDGWAY, PA. • SPRINGFIELD, O. • NEWARK, N. J. • DISTRICT OFFICES IN PRINCIPAL CITIES

In the life-lines of this power plant...



...FIRE will meet with SUDDEN DEATH!

Fire will never get a chance to knock the generators out of commission in *this* power plant!

Two generators—rated at 12,500 and 7,500 KW—form the heart of the power supply equipment—and *both* are protected by a *single* bank of *Kidde* cylinders of carbon dioxide (CO_2). In case of fire in either generator, automatic directional valves send the CO_2 racing to the unit threatened.

First, a heavy discharge of CO_2 smothers any active flame in a matter of seconds—before damage to the insulation can spread. Then . . . a slower, continuing discharge maintains a high CO_2 concentration . . . *prevents a reflash.* Of course, the CO_2 does not corrode metal or harm insulation.

That's just one of the thousands of *Kidde** installations that are safeguarding equipment and materials all over the world. *Whatever* your fire protection problem, a Kidde representative will help you!

When you think of CO_2, call Kidde!

*Also known as "LUX"

The words "Kidde" and "Lux" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

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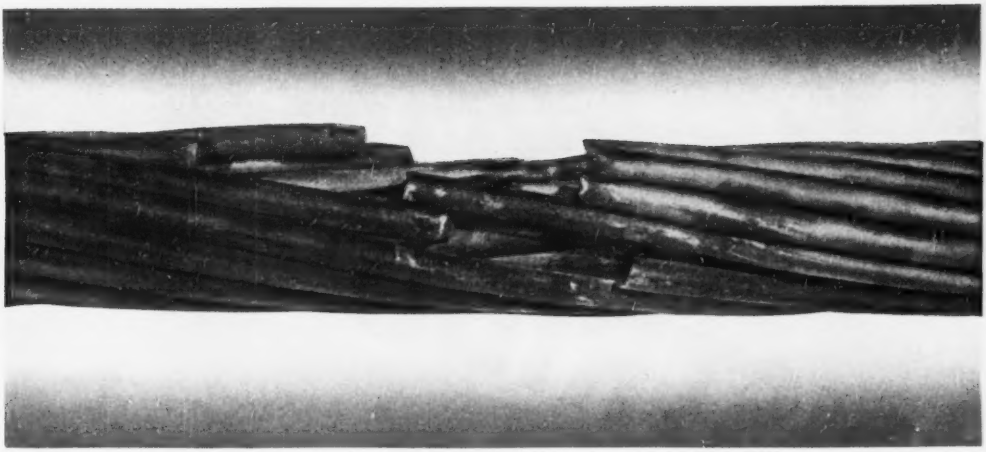
Kidde



How would you keep this conductor in operation?

There are many ways... but only one that assures the lowest-cost and most reliable job. It is the use of Preformed Armor Rods.

Multi-strand breaks repaired with Preformed Armor Rods *exceed* the strength and conductivity of the original conductor! And repairs are made at a *fraction* of the cost of cutting out and splicing . . . usually about 2% of any other conventional method.

Take the recent case of a large Mid-Western Public Utility*. Inspection revealed one to four strands broken on a 200 MCM, 7-wire, hard-drawn copper transmission line. Breaks occurred under clamps due to vibration and between towers due to lightning and flashovers.

Seventy-two inch lengths of hard-drawn bronze Preformed Armor Rods were applied to develop a tight-gripping cover over the breaks. *The average time for repairing a break was only three minutes!*

Whatever your problems of vibration damping, tapping, dead-ending, repairing or splicing . . . a simple system of Preformed Armor Rods will do the job better and cheaper than any other method.

Write Preformed Line Products Co., for complete details and a free sample of Preformed Armor Rods.

*name supplied on request

PREFORMED ARMOR RODS ARE FOR USE UNDER PATENT NO. 2,275,019—OTHER PATENTS PENDING.

EASY TO APPLY

The lineman takes from half to all rods needed for a complete installation and lays them across and around the conductor. The lay of the rods is in the same direction as the lay of the conductor.

He wraps these rods around the conductor several times. He uses a wiping action of the hands and a motion like wringing water from a cloth.

He continues the wiping action along the conductor.

The finished job.

PLP COMPANY

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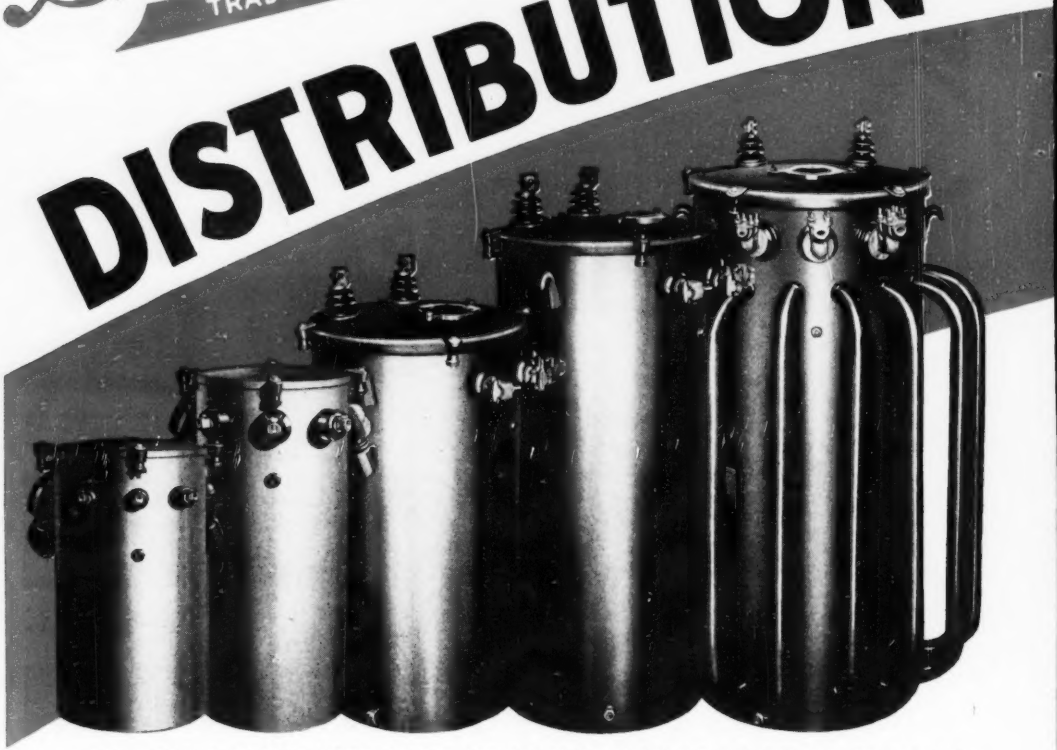
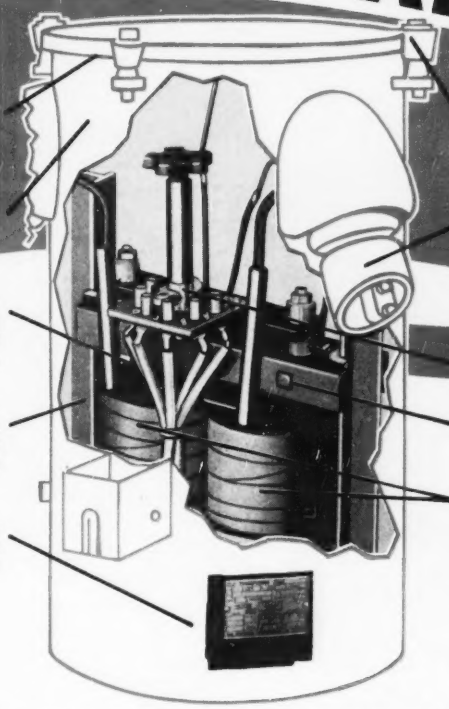


NOW A COMPLETE LINE OF ROUND TANKS IN SIZES THROUGH 100 KVA FOR POLE OR CROSS-ARM MOUNTING . . . . .

- **Heat dissipated twice as fast because of:**
  - (1) Greater coil surfaces
  - (2) Freer circulation of oil
- **Greater protection to transformer because of:**
  - (1) More clearance and insulation to prevent flash-overs
  - (2) Coil impregnation with elastic varnish
- **More durability of tanks because of:**
  - (1) Fabrication from heavy copper-bearing steel
  - (2) Butt-lapped and welded for strength and leak-proofing
- **Cylindrical design because of:**
  - (1) Convenience in handling and installation
  - (2) Better appearance of installations

All Standard transformers are built to or above requirements of EEI, NEMA, ASA and AIEE. Stock or special designs for your specific requirements may be had from STANDARD in STANDARD's proven quality.

TRANSFORMERS



1 Cover gasket of Neoprene gives complete moisture-proof seal and prevents oil leakage. Each unit pressure tested.

2 Tank of copper-bearing steel with seams electrically welded.

3 Core assembly of non-aging, low-loss, varnish coated silicon steel sheets, sheared and annealed to reduce core losses.

4 Steel T-bars welded to tank for easy insertion or removal of element assembly. Prevent movement in tank.

5 Name plate pad positioned and designed in accordance with ASA standards. Space provided for users plate.

6 Cover readily removed by loosening and rotating hold-down fingers. Entire interior is thus exposed.

7 High voltage pocket type bushings are brown glaze, wet process porcelain with [illegible] connectors. Co-ordinated so that flash-overs will occur externally rather than internally.

8 Porcelain tap changing switch.

9 Well-designed core clamping assures quiet and efficient operation.

10 Coil wound in two sections doubles heat radiation. Ends not blanketed, thus inducing free and effective oil circulation.

STANDARD's major contribution to the industry has been in the field of special design for difficult specifications. This experience assures you of maximum know-how that, when applied to distribution transformers, provides extra quality.

The extent of our representation affords you rapid answers to transformer problems — write today for the name of your near-by Standard representative. He is qualified to give you information on any type transformer and our service.

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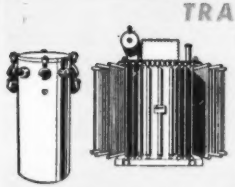
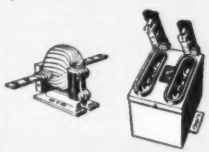
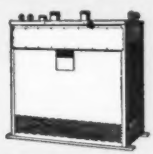


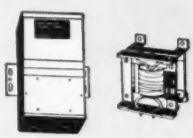
Liquid filled (sizes up to 10,000 KVA and 72 KV inc.)



Instrument transformers (for use on circuits up to 72,000 volts, inc.)



Dry type (up to 1000 KVA and max. voltage ratings of 4800)



Control transformers (compound filled or open type)

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● Your Central Conduit Distributor works hard at keeping everybody happy. He employs competent people to assure you of prompt and friendly service. And he maintains complete stocks of top-quality electrical materials like Central Rigid Steel Conduit.

Central Spang Conduit is made from full standard weight pipe that has been carefully selected and properly treated for every electrical raceway service. It's adaptable to every type of building construction and every length bears the Underwriters' Laboratories Seal of Approval.

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CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

Uptegraff type WA Specialty Transformer with ventilated weatherproof enclosure, for indoor or outdoor service. Sizes, 15 to 100 KVA.

Dry Type TRANSFORMERS

The built-in dependability and economy of Uptegraff Dry Type Transformers comes from engineering and manufacturing skill and experience. Available in standard types and sizes for immediate delivery, and promptly made in special styles to meet individual specifications when required by the application.

Some of the more popular Uptegraff Dry Type Transformers are illustrated here. Write for complete data and prices, giving capacity required and service for which the transformer is intended.

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MANUFACTURING COMPANY
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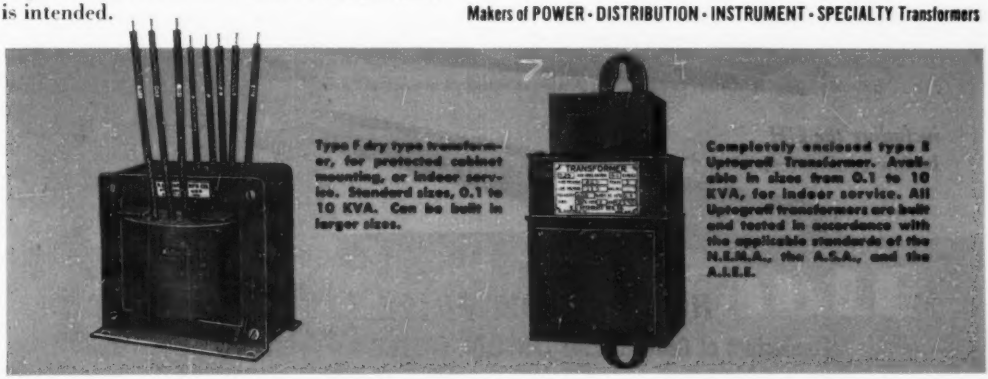
Makers of POWER - DISTRIBUTION - INSTRUMENT - SPECIALTY Transformers



Type F dry type transformer, for protected cabinet mounting, or indoor service. Standard sizes, 0.1 to 10 KVA. Can be built in larger sizes.

Completely enclosed type E Uptegraff Transformer. Available in sizes from 0.1 to 10 KVA, for indoor service. All Uptegraff transformers are built and tested in accordance with the applicable standards of the N.E.M.A., the A.S.A., and the A.I.E.E.

NO HALF-WAY MEASURES with GENERAL CABLE

- *Available on order as bare wire or weather-proof*
- *In solid and in stranded constructions*
- *For all voltages and in all sizes...*
- *including the HH hollow conductors.*

NO PREMIUM PRICE

Conductors of General Cable TENSILOK COPPER are quoted at exactly the same price as of Ordinary Electrolytic Copper.

CORPORATION

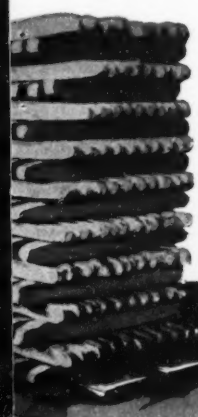
Look at these values in High Strength Retention on High-Temperature-Loaded Overhead Power Lines

95% Tensile Strength Retained After:

- 600 YEARS at 75° C
- or 100,000 HOURS at 100° C
- or 4,000 HOURS at 125° C
- or 250 HOURS at 150° C

An important *Added Factor of Safety* in long term resistance to annealing is inherent in General Cable's TENSILOK COPPER...On short lines substantially heavier base loadings may now be practical. On any lines, successive temperature overloadings of great magnitude can now safely be contemplated.

Hard-drawn TENSILOK COPPER stays hard, retains its tensile strength under conditions which would soon anneal commercial copper...The TENSILOK ultra-slow-annealing characteristic results from precise though minute metallic alloying. Purity, electrical conductivity, and tensile strength all exceed ASTM requirements for ordinary electrolytic copper.



Time-endurance testing at the General Cable Research Laboratory has produced strength retention figures which outdistance anything heretofore known. Our Engineers will be glad to lay before you the as-yet-unpublished Performance Curves for Tensilok Copper, and to discuss its possible application to your "look-ahead" planning.

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NEasbestus—the wire for "hot spots"—Asbestos and asbestos-varnished cambric insulated.

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Engineered for the jobs they are intended to do.

Built for top performance and maximum endurance.

They *add life* to appliances, tools, apparatus and equipment because they have plenty of *"abuse resistance."*

Guard your product reputation by using wires and cables of greater reliability, superior performance and longer life.

There's a National Electric insulated wire and cable for *every* purpose—also special wires and cables built to your specifications. Our staff of electrical wire and cable engineers will be glad to discuss your requirements with you. Call our nearest representative or write direct to the factory.

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Costs Can be Reduced

THERE is seldom if ever a year when any corporation can be complacently oblivious to its cost of operation. More than that, there are periods when it is especially urgent to watch expenses critically. The present period is such a time for the electric utilities, and there is no question whatever that every last one of them is aware of the need. Better yet, most of them are energetically taking both orthodox and unorthodox steps to lower their operating ratio by exercising economy.

It can be trite to review factors that differentiate regulated utilities from relatively free enterprises when it comes to profits, solvency, probable receipts, and permissible charges for their product and services. But the squeeze between delimited income and unlimited expenses always creates a potential scare for utility managements.

For one thing, it takes much longer to obtain permission to raise rates after the management's decision has been made. Also, electric utilities usually defer requests for price increases longer than most other businesses—often because they regret a reversing in the steady trend of reductions in rates that has been almost habitual during the last two decades.

The alternative is to bore into the methods of operation from attic to cellar, and that is manifestly what is being done. Most gratifying to the editors who explored these activities is the inescapable conclusion that the spirit to make savings and the attendant betterment in performance is evident all through the ranks. The ingenuity and the technical courage to try and to perfect unorthodox measures could not come through any amount of exhortation from above. They come from every bracket of employees, as is demonstrated by the nature of many of the unconventional procedures that grace the ensuing pages.

This recital of the tricks and tools of the enlivened drive to reduce costs of operation should, therefore, achieve two things. It should show the public in general and the managements in particular that the electric utility employees across the country are conscientiously devoted to the cause of their industry and generally eager to exert themselves toward better productivity on their own part and lessened company outlay for the operations that have become unduly costly.

Mechanization and time-saving tools are proving great helps. Measures that promote safety are justifiably in the class of economy because there is hardly anything more costly than an avoidable accident. Some measures involve practically no outlay at all but achieve savings by simplifying procedures in billing, record keeping, stores, etc. Some are definitely homemade devices for which no counterpart is available on the equipment market.

Whatever the approach, whatever the segment of the business, or whatever the job level, there are things that can readily be done to keep the operations at less expensive levels. That they are being done in a commendable way is demonstrated in the ensuing pages.

If Edison Could See the Industry Today

SEVENTY YEARS and a day before the date of this issue of ELECTRICAL WORLD, Thomas Edison concluded, after watching it burn for 40 hours, that he had produced a practical electric incandescent lamp. Then, deliberately, he burned out that first successful lamp. He boosted the voltage until the frail cotton thread filament evaporated

in a blaze of light. He wanted to find out how much electricity the lamp would stand. He was the kind of man who always wanted to find out things.

Men who find out things are the builders of our modern world. Their worth is not often appreciated by their contemporaries. So it was with Edison. The cartoon on this page, reproduced from an 1880 issue of the comic magazine, "Puck," indicates what people generally thought about the inventor and his lamp—cart him off to the dumping ground along with other nuisances.

Fortunately, however, there were some who did not share the popular opinion. Among them were a few with money and with the courage to risk it in Edison's crazy ideas. After he had proved that his ideas were not so crazy after all, risk money became available in large quantity to start power companies in business in growing number over the nation. This went on for half a century and the industry grew and prospered.

Then on Oct. 21, 1929, the inventor sat again in his Menlo Park laboratory, which had been reconstructed at Dearborn, Mich., by his friend, Henry Ford. Surrounded by those of his co-workers who had survived and by the shades of those passed on, he re-enacted the historic scene of 50 years before. This was the high point of "Light's Golden Jubilee." But now there were no scoffers, no belittling words. Reverent tribute was his meed, and the great of the earth did him honor. On that occasion he marveled that from such small beginning had "come the stupendous electrical industry of today." Now, 20 years after he spoke those words, how much greater would be his wonder to see the industry doubled in size, tripled in output, from what it was in 1929. And he would be thrilled to see the industry halfway through a six-year construction program that will add almost as much capacity as the total installed when he spoke of its "stupendous growth" in 50 years.

But, we think, if Edison could come back and look today at the industry he did so much to create, he would express more than wonder and amazement at its growth. He would remember his own words, "Any large extension of the government into business affairs—no matter what the pretense and no matter how the extension is labelled—will be bound to promote waste and put a curb on our prosperity and progress." There are men still living who can remember how Edison could talk, not for quotation, but freely, off his chest, about things he knew were wrong. Let us leave what he would say to the recollections of the old timers and to the imaginations of the younger generations.

Progress in Control of Air Pollution

"ALTHOUGH the privately owned, tax-paying utilities burn less than 20% of the coal consumed in this country, our industry owns more than 80% of all the modern dust and cinder collecting equipment installed on coal-burning boilers."

This important tribute to the industry was made by Messrs A. L. Penniman, Jr. and E. F. Wolf of the CGEL&P Co of Baltimore before the spring meeting of the Smoke Prevention Association of America. These facts relating to the industry's activities were presented with the view of showing the extent to which the industry is cooperating with smoke prevention authorities.

Other facts brought out in this address amplify the contribution of utilities through research costs absorbed in purchase price of equipment, individual company research projects, development of "Cyclone" furnace, and expense of adapting equipment to old plants.

The industry deserves much credit for this fine record of devotion to civic responsibility. But, as is the history of the electrical industry, it will not stop until the job is complete. Sulphur content of gases is still a problem to be brought under control. Messrs Penniman and Wolf suggest the possibility of its removal either from the stack or at the mines. If there is any remote danger from this pollution, it can be assumed that appropriate steps will be taken by the industry.

The Electrical Week

Congressional investigators of insurance company investments in utilities have got the facts, but they were not the ones expected. The great bulk of new utility issues have not been sold directly to insurance companies in negotiated sales . . . The Federal Power Commission has issued an order allowing Idaho Power Co to build its controversial transmission lines from its Bliss project. But pressure from the Interior Department led to a clause requiring the utility to wheel federal energy . . . EEI's President Elmer L. Lindseth announced some good news at a press conference in New York. Half way through their six-year expansion program, the electric utilities have already raised 60% of the $9 billion needed and should have no trouble raising the other 40% . . . And in the Northwest, Seattle has told the PUD's that it is no longer interested in the Puget Sound Power & Light properties. The reason: The PUD's propose to keep two generating plants that Seattle also wants.

White House intervention in the coal strike is imminent unless Lewis and mine owners get together soon. End of the steel strike is not in sight. The same is true of the strike of 16,000 workers in nine Aluminum Co of America plants. But only half of Alcoa's production is affected, and no critical shortage of aluminum is foreseen.

Mon Wallgren's appointment to Federal Power Commission, vice Leland Olds, revives the left-of-center majority of FPC. It also links FPC closer to the White House, probably, through the Truman-Wallgren friendship. But the Securities & Exchange Commission changes appear to have little significance to the industry.

The Omnibus Rivers and Harbors Bill, authorizing projects costing $1,000,000,000-plus, has been shelved until next year. Controversial additions made by Senate Public Works Committee face a fight in the House when action is resumed next session.

Employer, as well as union, can be liable for lost wages if a worker is fired at union demand when a union-shop contract has not been legalized by an election.

REA won't grant First Iowa Hydro-Electric Co-op the full $30-million loan it is seeking. The agency simply cannot sink that much in one state under existing law. But REA still is hunting a way to help First Iowa's project to divert the Cedar River.

House committee hearings on lobbying won't get under way until next January. First job of committee Chairman Frank Buchanan, Pennsylvania Democrat, is to sift through some 200 applications to fill a handful of staff jobs. The investigating group was voted $40,000, marked down by the House from a requested $50,000.

French industrialists look with favor on American drafting practices, especially on that of simplification of drawings through use of symbols. The industrialists claim French draftsmen are too artistic, consider each drawing an artistic creation rather than a tool for industrial production.

Self-employed electrical engineers are specifically exempted from government Social Security coverage under the liberalizing amendments passed by the House last week. The House broadened the law to include self-employed persons but omitted many professional groups.

"Electrical World" has a new rating with the Post Office Department. The PO has agreed that EW is entitled to newspaper handling. This means traveling on the fastest trains to main distributing centers and prompter delivery by local post offices.

Notes From The News

Arkansas Power & Light Co will name its power plant under construction near Palestine, Ark., for Pres C. Hamilton Moses . . . Schenectady observed "Charles E. Wilson Day" on Oct. 19. The General Electric president was the first man so honored by the city . . . Power output in Austria in 1948 was 137% higher than in 1947 . . . Albert J. Fitzgerald, president of the United Electrical Workers, CIO, has been found guilty of "conduct detrimental to the welfare" of the union by trial committee of his local at Lynn, Mass. Next week the membership will vote on whether to bar him from holding office in the local for one year. Fitzgerald did not follow voting instructions at the last national convention. He voted for himself for president instead of for the business agent as he had been instructed.

Facts Foil Insurance Company Probers

Congressional Investigation Reveals Companies Are Heavy Purchasers of Utility Securities but Negotiated Sales Only Small Part of Total

Utility financing will get a going-over at the hands of the 81st Congress. It started last summer—but it was just a start. Rep Robert Crosser, Ohio Democrat and chairman of the House Interstate Commerce Committee, introduced legislation giving the Federal Power Commission authority to order competitive bidding on gas pipeline issues. New Yorker Emanuel Celler, who heads the House Judiciary Committee, started a broad-scale investigation of investment practices, with especial attention to financing of utilities. The latter phase of the probe didn't prove exactly what Celler expected. But he plans further hearings next year. Meanwhile, it behooves the thoughtful utility executive—in fact, everyone interested in the future of the industry—to familiarize himself with the facts at which Celler is probing: Comparative employment of competitive offerings and negotiated sales of securities, investment of insurance companies in utilities, general trends along these lines in financing of other industries.—*Editor*

THE RECENT Congressional investigation into insurance company purchases of utility bonds (EW-Sept 3,p5) brought to light some interesting trends in corporate financing. But the trends weren't quite those the investigators were expected to find.

For some years the belief has been widely held in non-industry circles that the great bulk of new utility issues have been sold directly to insurance companies in negotiated sales. It's true, of course, that substantial utility offerings are being disposed of in that way. But analysis of statistics compiled by the Securities and Exchange Commission discloses that the extent of such private placements has been considerably overestimated.

The SEC figures show these trends:

(1) Private placements by all corporations (including non-utility) continue high, though the percentage negotiated during the first six months of 1949 is down sharply from last year (Table I).

TABLE I—Issues of All Types of Corporations

Year	Total No. Issues	Privately Placed*	Percentage Placed
1934	397	92	23.2
1935	2,332	387	16.6
1936	4,572	373	8.2
1937	2,309	330	14.3
1938	2,155	692	32.1
1939	2,164	706	32.6
1940	2,677	765	28.6
1941	2,667	813	30.5
1942	1,062	420	39.6
1943	1,170	372	31.8
1944	3,202	787	24.6
1945	6,011	1,022	17.0
1946	6,900	1,917	27.8
1947	6,577	2,235	14.0
1948	7,248	3,258	45.0
1949**	3,421	1,098	32.1

* Millions of Dollars.
** 1st 6 Mos.

(2) There has been a continuing increase—absolutely and relatively—in the number of private placements of preferred and common stock; the great bulk of private placements, however, are still bond issues (Table II).

(3) Insurance companies are steadily increasing their share of total private placements (Table III).

(4) Utilities no longer account for the bulk of private placements.

The Celler (House Judiciary) Committee has undertaken the job of preparing revisions of the anti-trust laws whenever revisions seem needed. So far, only the utility phase of the investigation has been covered, but, as yet, no legislative recommendations have emerged. Perhaps the statistics unearthed by the committee and analyzed below explain why. Certainly they show conclusively that utility financing has followed, rather than led, general money market trends in the postwar era.

In 1948, private placements of all corporate issues—utility and non-utility—reached a record total of $3.3 billion. This compares with $2.2 billion in 1947, $1.9 billion in 1946 and only $92 million in 1934 (Table I).

Public offerings, on the other hand, declined to $4 billion last year—as compared with $4.3 billion in 1947, $5 billion in 1946 and $23 million in 1934. Thus, to last December, the relative volume of privately placed securities had been increasing—from, say, 23% in 1934 to 45% last year.

The first half of 1949, however, has seen a reversal of this trend. Private placements came to about $1.1 billion —only 32%.

Best explanation for this long-term swing to private placements: The uncertainties involved in going to the public via underwriters and the securities markets frequently present insurmountable barriers to the quick-money requirements of industries engaged in heavy spending such as the expansion program of utilities.

Back in the '30's, U. S. corporations rarely considered peddling preferred or common stocks privately to institutional investors. One reason: They could get needed money much more cheaply through debt issues.

Then, too, the big investors have to carry preferreds at market and when the market breaks preferreds slide all too easily. So the books show a capital loss. (Bond-owners don't have to worry so much; bonds mature eventually and can always be carried at cost or face.)

But recently preferreds have been

TABLE II—Private Placements of All Types of Corporations Classified by Type of Security

(In Millions of Dollars)

Year	Total Placements	Debt Issues	Preferred Stocks	Common Stocks
1934	92	92	0	0
1935	387	385	2	0
1936	373	369	1	3
1937	330	327	3	0
1938	692	691	1	0
1939	706	703	3	*
1940	765	758	2	5
1941	813	811	1	1
1942	420	411	9	0
1943	372	369	0	3
1944	787	778	7	2
1945	1,022	1,004	11	7
1946	1,917	1,863	42	12
1947	2,235	2,147	79	9
1948	3,258	3,177	61	20
1949**	1,098***	1,068	25	6

* Less than $500,000.
** 1st 6 Mos.
*** Total accurate, sub totals rounded off.

TABLE III—Corporate Bonds Placed Privately Percent of Total Amount Purchased by Various Investors

Type of Investor	1940	1941	1942	1943	1947
Life Insurance Companies	88.1	93.4	94.8	91.9	93.0
Other Insurance Companies	0.1	0.2	...	0.5	0.1
Banks	11.2	5.9	4.8	6.2	2.7
Other Institutions	0.5	0.5	0.4	0.8	2.5
Individuals & Corporations	0.1	0.1	...	0.7	0.4
TOTAL	100.0	100.0*	100.0	100.0*	98.7**

* Total reconciled to allow for rounding off of decimal fractions.
** Purchases of 1.3% of issues have not yet been identified.

gaining in popularity (Table II). Up to 1941, no more than $3 million worth had ever been sold privately in one year. But in 1947, some $79 million were disposed of through negotiated sales. For 1948, the figure was $61 million.

Here's why preferreds are in the picture: Top-grades are paying 3.8 to 3.9%—considerably above the yield on new prime debt issues. Also, the supply of quality bonds is not quite equal to the demand.

Common stocks are getting a play too—largely because of the irresistable yields available at current market prices.

In recent years, substantially more than 90% of all privately placed securities have been going to insurance companies—mainly life insurance companies. (Banks, corporations, and other institutions are taking the rest—Table III).

Practically all insurance-bought private placements have been mortgage bond and debenture issues; though preferreds increasingly are finding ready acceptance, insurance companies still buy relatively few equity issues.

Though figures aren't available be-

TABLE IV—Percentage of Public Utility Securities Placed Privately

Year	Total Public Utility Offerings	Private Placements	Percentage of Private Placements
1934	133	48	36.1
1935	1,284	152	11.8
1936	2,040	218	10.7
1937	771	61	7.9
1938	1,234	299	24.2
1939	1,271	457	36.0
1940	1,203	391	32.5
1941	1,357	458	33.8
1942	472	191	40.5
1943	477	101	21.2
1944	1,422	297	20.9
1945	2,319	290	12.5
1946	2,158	325	15.1
1947	3,257	529	16.2
1948	3,112	651	20.9
1949*	1,812	339	18.7

* 1st 6 Mos.

yond 1947, it seems safe to assume there has been no substantial change in this picture: Of all corporate bond placements, life insurance companies took 88% in 1940, 95% in 1942, and 83% in 1947.

During the first six months of this year about 19% of all public utility financing was arranged privately (Table IV). That was about the same proportion as for 1948—but is represented a sharp decline from the '30's and early '40's.

Back in 1934, when SEC began compiling statistics, utility private placements came to $48 million—36% of the $133 million total. In 1942, private

TABLE V—Public Utility Private Placements as a Percentage of All Private Placements

Year	Total Private Placements*	Utility Private Placements*	Percentage Utility Placements
1934	92	48	52.2
1935	387	152	39.3
1936	373	218	58.2
1937	330	61	18.3
1938	692	299	43.8
1939	706	457	64.7
1940	765	391	51.1
1941	813	458	56.3
1942	420	191	45.5
1943	372	101	28.0
1944	787	297	37.7
1945	1,022	290	28.3
1946	1,917	325	16.9
1947	2,235	529	23.2
1948	3,258	651	20.0
1949**	1,098	339	30.9

* In Millions of Dollars.
** 1st 6 Mos.

placements reached 41% of total utility securities issued. But since then the statutory requirements of competitive bidding have caused a drop in the proportion of private placements to total offerings.

In comparison with the total of all negotiated sales, private placement of utility issues has also been playing a diminishing role.

In 1934, utility private placements were worth $48 million—52% of the total. By 1939 the percentage had grown to 65. But since the war's end, the competitive bidding requirement has lowered the proportion—to 20% in 1948. For the first six months of this year, the percentage has jumped to 31—due largely to the increased exemptions from competitive bidding made necessary by the recent business downtrend.

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Utah P&L to Burn Pitch as Fuel at New Station

Utah Power & Light Co has signed a long-term contract with Standard Oil Co of California under which the latter will supply pitch as a low cost fuel for the new 63,000-kw steam-electric generating station in Salt Lake City.

The low grade, residual fuel oil, which will come from Standard's subsidiary Salt Lake Refining Co plant in north Salt Lake, will include the residue from Uintah County gilsonite, after gasoline and other light petroleum products have been extracted. The gilsonite is now sent through the oil line to Salt Lake refinery after being liquefied.

Equipment for burning pitch as compared to the original cost of coal-handling facilities will reduce the cost of the new power station by about $500,000 to an estimated $10.5 million.

Idaho Power Ordered to Wheel Federal Energy

Rebuffed last month in a U. S. District Court, the Interior Department last week bounced back to win the latest round in its scrap with Idaho Power Co over a power line. The Federal Power Commission has issued an order requiring the company to carry federal power on the controversial line it is building from its Bliss hydroelectric plant to substations at Boise and American Falls.

The new FPC order, announced Oct 14, authorizes a license to Idaho Power for construction of two 138-kv transmission lines from the Bliss project, with the special condition that the U. S. may interconnect any of its transmission facilities with the lines when there is capacity in excess of the company's needs. The special conditions were requested by the Secretary of Interior, and the FPC emphasized that this was the first time such conditions had ever been adopted in a Commission order authorizing issuance of a license.

Under terms of the new order, federal power would be transmitted over the lines only to preference customers and only in amounts that will not "unreasonably interfere" with the company's use of the lines.

The controversial lines run, in part, across public lands over which Interior has jurisdiction. Interior sought the right to transmit power on the line which the company began constructing after receiving pre-license consent from FPC last May. When the company objected to the Department's demand, Interior, through the Department of Justice, filed suit. Construction was halted in August when the U. S. District Court in Boise issued a temporary restraining order. But, on Sept 30, the court refused to grant an injunction against the transmission construction and dismissed charges of trespass against the company (EW, Oct 8, p 89).

This week Interior officials, who had indicated they would urge appeal of the decision, are studying the new FPC ruling. If the unprecedented conditions of the FPC order meet Interior demands, further court action probably will be dropped.

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To Add Hutsonville Unit

Central Illinois Public Service Co will add a 65,000-kw generator to its Hutsonville Station. The addition, scheduled for completion in 1952, will increase the station's capacity to 115,000 kw. It is part of the utility's $65-million postwar expansion program.

DEDICATION of first 80,000-kw unit at new Potomac River Plant of Braddock Light & Power Co at Alexandria, Va., brought together James W. Lauderdale, left, vice-chairman, District of Columbia Public Utilities Commission; A. G. Neal, president of the parent Potomac Electric Power Co; Nelson Lee Smith, chairman, Federal Power Commission; and R. Roy Dunn, vice-president and treasurer of Pepco

Utilities Have 60%, Expect No Job Getting Rest of Expansion Funds

JUST BEYOND the halfway point, timewise, in their six-year expansion program, the nation's electric light and power companies have raised 60% of the money they will require. And it wasn't nearly as tough a job as anticipated, thanks to the healthy condition of the industry.

Barring undue federal, or federally encouraged, competition which would scare off investors, the industry should have no serious difficulty in financing the remaining 40% of the $9-billion program.

This view was expressed by Elmer L. Lindseth, president of the Edison Electric Institute, at a press conference in New York this week (Oct 18). He also reported the industry had completed more than half the actual construction planned in its postwar program.

Lindseth, tying in his "state-of-the-industry" report with the 70th anniversary of Edison's invention of the incandescent lamp, stressed the need for investor confidence. From depreciation reserves and other internal sources of cash, the power companies have produced $2,265 million, he pointed out. But the remaining $3,120 million raised for the construction program to date came from sales of securities.

During the remainder of 1949 and in the next two years, the industry will require about $3,615 million to complete the expansion program. Of this total, EEI estimates $1,500 million will come from depreciation reserves, retained earnings, and other internal sources. This leaves some $2,115 million to be raised through sale of securities.

"To date, the securities of the electric utility companies have been well received by the investing public, and we are doing all things possible to insure the continuance of a healthy market for our forthcoming issues," Lindseth asserted.

Yet the industry is faced with an extraordinary paradox. Customer relations are the best ever, industry growth is rapid, and rates are low. "But, notwithstanding an excellent record of performance, our business is faced with extensive encroachment . . . by the federal government and nationalization of whole segments of this major basic industry," he said.

After two years, during which it was "nip-and-tuck to meet the rising demands" for power, the industry now is "over the hump" on that problem, Lindseth added. The six-year program will add about 21-million kw, and installations already completed have vastly improved the reserve picture. As against reserve capacity of 5.4% in 1947 and 5.8% last year, the reserve margin is expected to mount to 12% or more by the end of 1949. For 1950 and 1951, reserve capacity will be up to 15% and 18% respectively, it was predicted.

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Utility Will Supply Cairo

Central Illinois Public Service Co has agreed to supply the Cairo municipal system with electricity at the same rate which applies to electric cooperatives. The contract is to run for 10 years.

G. R. Trumbull Retires from Better Sight Bureau

Glen R. Trumbull, manager of the Better Light Better Sight Bureau, has retired. He has been manager of the Bureau since its organization in 1934. His successor will be announced at a later date.

Born in Norwalk, Ohio, in 1884, Trumbull attended Ohio State University. He entered the electrical industry in 1909 with Henry L. Doherty & Co. He remained with this company until 1922, the last seven years as assistant general commercial manager. From 1922 to 1930 he was general commercial manager of the A. E. Fitkin Co.

After spending two years with American & Foreign Power Co, he was appointed manager of the National Electric Cookery Council, a cooperative organization of electric utilities and appliance manufacturers. He left this position to head the Better Light Better Sight Bureau.

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Passage of REA Phone Bill Expected This Week

Final approval of the bill to put the Rural Electrification Administration in the business of making loans for farm telephones was expected this week.

House-Senate conferees reported out a compromise bill which places no limitation on the number of subscribers a borrower may have, permits loans to be made for refinancing up to 40% of any single loan, and gives existing phone companies a one-year head start on loans.

In the bill a rural area is defined as outside "the boundaries of any incorporated or unincorporated city, village, or borough having a population in excess of 1,500 inhabitants."

ONE OF CENTRAL Europe's largest power dams, under construction at Kaprun in the American zone of Austria, will produce 600 million kwhr annually. The dam, to impound more than 80 million cubic meters of water, will be 120 meters high and 354 meters long. Marshall Plan counterpart funds have made possible the project, scheduled for completion in 1950

Seattle Quits Race for Puget Sound Facilities; Law's Legality Challenged

THE STRUGGLE by Washington municipalities and public utility districts to dismember the Puget Sound Power & Light Co took an odd twist last week.

1. The City of Seattle notified the PUD's that it was no longer interested in the Puget Sound properties since "it is apparent to us (the mayor and City Council) that the public utility districts are reluctant to surrender title to any generating facilities."

2. At Olympia, a suit was filed in Thurston County Superior Court challenging the constitutionality of the power act under which the PUD'S seek to make the purchase.

The action by Seattle followed an offer by the PUD's, if successful in their efforts, to take over the Puget Sound facilities, to supply Tacoma and Seattle with power. The terms proposed were a firm contract "on a five-year basis at a fixed rate of $17.50 per kilowatt year at the then existing Puget system load factor for a maximum of five years." After five years the cities could share "the same type of service-at-cost contract pursuant to which the districts propose to obtain power from such facilities for themselves, and at the same cost."

Seattle has been seeking to acquire the Puget Sound distribution system in its area and the Snoqualmie and White River power plants. By spurning the offer of the PUD's, the City makes it possible for them to become its competitors. Mayor William F. Devin is not worried. "Our local municipal system has competed successfully with the private company for many years and can continue to do so with the PUD's."

A PUD spokesman declared they had no intention of competing with Seattle City Light. The PUD's had planned to sell the distribution system to the city. With such a sale now unlikely, Seattle is in a position to condemn Puget Sound properties when the franchise expires in 1952.

J. Frank McLaughlin, Puget Sound president, assailed the City's action as "difficult to interpret and comprehend." He added:

"It is inconceivable to me that the City does not fully appreciate that by declaring the company out of business in 1952 it has assumed a responsibility of assuring adequate electric service to all the people of Seattle. The cheapest way . . . is by the acquisition of Puget's facilities in the competitive area."

The entire picture will be changed, however, if the law passed by last year's legislature is declared unconstitutional. It was this law that allowed the PUD's to band together to buy up privately owned utilities. Previously they could buy properties only in the county in which they operated.

Olympia firms and individuals brought the action to prevent the Thurston County PUD from joining seven other PUD's in the purchase plan. The plaintiffs contend the act is illegal because it embraces more than one subject, because it amends a 1931 law but does not set forth the 1931 law at length, and because PUD sections of the bill were added to another bill as amendment, thereby changing the scope and objects of the original bill.

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Obermeyer Quits Con Ed to Join Bozell & Jacobs

Henry Obermeyer, director of advertising, Consolidated Edison Co of New York, has resigned to become vice-president of Bozell & Jacobs advertising agency, New York City. Bozell & Jacobs is public relations counsel for the electric utility industry's Public Information Program.

HENRY OBERMEYER

Obermeyer entered the utility business as editor of the *American Gas Association Monthly*. He joined Consolidated Gas Co in 1926 as a copy writer and later was made responsible for its advertising operations. When the Consolidated System electric and gas companies merged, he was put in charge of the combined departments as assistant vice-president of Consolidated Edison.

As a member of the board of the Advertising Federation of America and chairman of its Code Committee, Obermeyer helped draft the Code of Advertising Principles, widely adopted by American and foreign advertising groups. When he was president of the Public Utilities Advertising Association, he initiated the annual survey and guide to advertising and public relations expenditures, now covering 180 electric and gas companies. He has served on the Board of Governors of the Electrical and Gas Association of New York for a number of years.

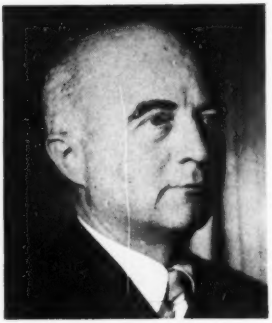
SEC Staffers Named to Commission; No Major Policy Changes Expected

NO MAJOR changes in Securities and Exchange Commission policies were expected after the latest SEC top-level personnel turnover last week: resignation of Chairman Edmond M. Hanrahan and nomination by President Truman of two veteran SEC staffers to the commission.

Edward T. McCormick of Arizona, assistant director of SEC's Corporation Finance Division, was named to serve out Hanrahan's unexpired term, and Donald C. Cook of Michigan, one-time assistant director of the Public Utilities Division, was designated for the vacancy created by the resignation last June of Robert K. McConnaughey.

The nominations, announced Oct 12, are subject to approval by the Senate. If Congress adjourns before the new SEC officials are passed on, they will probably serve under recess appointments until next year. Observers predict quick confirmation when the Senate does consider the names.

Hanrahan, who will return to the New York City law firm of Sullivan, Donovan & Heenehan, with whom he had been associated before going to the Commission three years ago, submitted his resignation to President Truman "with great reluctance and only because I can no longer, with justice to my family and myself, devote my time to public service." His resignation came as Congress was upping the salary of Commission members from $10,000 to $15,000 per year, but it was understood that financial as well as other family considerations prompted the decision.



EDMOND M. HANRAHAN

Since coming to SEC, Hanrahan has continued to commute between his Long Island home and his office in the capital.

New chairman, to succeed Hanrahan, will be chosen by Commission members. Choice is expected to be Paul R. Rowen, democratic commissioner.

Cook, whose term will expire June 5, 1954, is a partner in the Washington, D. C., law firm of Cook & Berger. A native of Escanaba, Mich., the 40-year-old nominee served on the SEC staff from 1936 to 1943. He was special counsel to a House of Representatives subcommittee on naval affairs during the war and was alien property custodian in the Department of Justice before resigning to enter private law practice.

McCormick, 38, has been with the Commission since the first months of its operation in 1934. An accountant and native of Tucson, Ariz., he is the author of the book, "Understanding the Securities Act and the SEC." His term expires June 5, 1952.

The new shifts are only the latest for an agency which has had a high turnover. The new nominees will be the twenty-second and twenty-third commissioners to serve in 15 years.

SEC NOMINEES are staff members, Donald C. Cook, left, and Edward T. McCormick

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Wallgren Named to FPC; Olds' Plans Not Known

Ex-Gov Mon C. Wallgren of Washington was named Oct 18 by President Truman for the Federal Power Commission post which the President unsuccessfully sought for Leland S. Olds. Wallgren appeared certain to make the grade.

Only the imminent adjournment of Congress stood as a possible barrier to confirmation. Within a few hours after the nomination was made the Senate Committee on Interstate and Foreign Commerce unanimously approved him. Failing confirmation, Wallgren was certain of an interim appointment.

Wallgren, an optometrist and jeweler by vocation, is considered an ardent public power supporter. Last February Truman nominated him for chairman of the National Security Resources Board. The Armed Services Committee tabled the nomination, thus preventing it from coming to a vote in the Senate. The President later withdrew the nomination, and the position has remained vacant.

A native of Des Moines, Iowa, the 58-year-old nominee resides at Everett, Wash.

The nomination came less than a week after the Senate smashingly rejected Leland Olds' reappointment to FPC by a 53-15 vote. Olds, for ten years an important figure on FPC, has announced no plans for the future.

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Penelec to Add 2 Units

Pennsylvania Electric Co will add two turbo-generators with a total capacity of 55,000 kw to its Front Street Station at Erie. The larger of the two units will have a rating of 40,000 kw. The smaller, known as a topper unit and rated at 15,000 kw, will be used in conjunction with the station's present low-pressure turbines. Present station capacity is 62,000 kw. Cost of the turbines, two high-pressure boilers, other and building equipment will be $12.5 million. Construction is to start in March, 1950, and be completed late in 1951.

Changes in Capacity Reported to Federal Power Commission

PLANT ADDITIONS DURING AUGUST

Utility	Plant	Fuel	Capacity (Kw)
Bangor Hydro Electric Co	Milford, Me.	H	1,600
Narragansett Electric Co	Manchester, R. I.	S	40,000
Central New York Power Co	High Dam #6	H	2,200
Pennsylvania Power & Light Co	Sunbury	S	75,000
Indiana & Michigan Electric Co	Twin Branch (Ind.)	S	125,700
Wisconsin Electric Power Co	Port Washington	S	89,900
Border Counties Power Cooperative, Inc	Littlefork, Minn.	IC	520
Rochester Electric Light Department	Rochester, Minn.	S	7,500
Iowa Southern Utilities Co	Ottumwa	S	10,000
Otter Tail Power Co	Walhalla, N. D.	IC	600
Minkota Power Cooperative, Inc	Grand Forks, N. D.	IC	5,160
Sidney Public Utilities	Sidney, Neb.	IC	1,400
Coffeyville Light & Power System	Coffeyville, Kan.	S	10,000
Virginia Electric & Power Co	Chesterfield #2	S	60,000
Potomac Light & Power Co	Riverton, W. Va.	S	34,500
Washington Electric & Water Department	Washington, N. C.	S	5,000
Tennessee Valley Authority	Watauga Hydro	H	25,000
Mississippi Power Co	Eaton	S	22,500
Arkansas Power & Light Co	Cecil Lynch	S	60,000
Central La. Electric Co	St. Landry	S	10,000
Pawhuska Light & Power Department	Pawhuska, Okla.	IC	1,400
Houston (Tex.) Lighting & Power Co	Green's Bayou	S	66,000
West Texas Utilities Co	Abilene	S	15,000
Idaho Power Co	Salmon-Diesel	IC	150
Lamar Light & Power Co	Lamar, Colo	IC	1,136
Pacific Gas & Electric Co	Colgate (Calif.)	H	24,000
Southern California Edison Co	Redondo Beach #1	S	60,000

PLANT RETIREMENTS DURING AUGUST

Bangor Hydro Electric Co	Milford, Me.	H	1,520 (est.)
Border Counties Power Cooperative, Inc	Littlefork, Minn.	IC	130
Fitzgerald Water Light & Bond Commission	Fitzgerald, Ga.	S	700
Florida Power & Light Co	Arcadia	S	1,100
Idaho Power Co	Portable	IC	150

H—Hydro, IC—Internal Combustion, S—Steam
United States Capacity as of Sept. 1—Steam, 42,090,264 Kw.; Internal Combustion, 1,706,010 Kw.; Hydro, 16,227,908 Kw.; Total, 60,024,182 Kw.

Democrats Will Boost Public Power at Boston

Federal development of New England's unharnessed hydroelectric power will be a major topic at the six-state Democratic regional conference in Boston, Nov 20-21.

The Boston sessions are part of a series of regional meetings scheduled by the Democratic National Committee to win friends and influence voters before next year's Congressional elections. The National Committee will send to Boston a number of Truman Administration bigwigs—about the same troupe that talked up power and reclamation at the recent Western States conference in San Francisco.

Besides hydro power, the conference speakers will discuss the Brannan farm plan, Taft-Hartley repeal, and employment.

But the emphasis will be on rallying support for proposed area-wide developments of the federal government. Individual projects to be discussed include the Passamaquoddy tidal power project and proposed basin-wide developments of the Merrimac and Connecticut Rivers. The Democrats also will come out again for the St. Lawrence Seaway, emphasizing their sympathy with New England's demands for project power, as opposed to New York claims that it can absorb the bulk of such energy.

Democratic headquarters claims that demand for federal power development is surging in New England. Even some segments of industry are reported backing the demand on the basis that cheaper power is needed to keep industry in the area.

Secretary of Labor Tobin, Secretary of Agriculture Brannan, and Governors Bowles of Connecticut, Dever of Massachusetts, and Pastore of Rhode Island will be among the Boston speakers. The Democrats also have invited some business spokesmen, including Charles Luckman, president of Lever Bros, to give the program a business flavor.

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Lake Region Cooperative Is Formed in Oklahoma

A new electric cooperative, Lake Region Electric Cooperative, Inc, to serve Wagoner and Cherokee Counties and parts of Muskogee and Tulsa Counties has been formed at Wagoner, Okla. Allocations have been approved for extension of lines valued at $500,000 in the new district.

The districts making up the new co-op formerly were part of the system of East Central Oklahoma Electric Cooperative, Inc with headquarters in Okmulgee. Directors of the latter agreed to drop these districts and transfer assets of approximately $1 million to the new unit.

Leagues Stress Group Action to Gain Markets

Cooperative action among League members to provide market expansion was the point stressed most often at the meeting of the International Association of Electrical Leagues, Oct 12-15, at Cleveland. Sales increases of 25 to 30% for electric ironers were given as the results of one simultaneous program.

A. H. KESSLER, left, is congratulated by J. Clark Chamberlain, retiring IAEL head

The sessions, conducted on the basis of panel discussions, were an inspiration in terms of serious investigation of League problems and solutions. Many ideas for expansion of sales were contributed including use of four degrees of electrical living program, national radio week, school for home freezers, dealers as certified pay stations, theater promotions, and cooperative activities with local merchants.

Officers elected for the coming year were A. H. Kessler, secretary, North Central Electrical Industries, Minneapolis, president; H. P. Wilson, secretary-manager, Electrical Institute of the Tri-Cities, Rock Island, Ill., vice president; and J. G. Waddell, managing director, Electric Institute of Boston, treasurer. O. C. Small, manager, Business Development Department, National Electrical Manufacturers Association, was reappointed secretary, and J. F. Biggi, also of NEMA, assistant secretary.

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Sturgis Buys Power

Sturgis, Mich., has signed a 10-year contract for purchase of power from Indiana & Michigan Electric Co, South Bend, Ind. A clause in the contract gives the city authority to expand its own power facilities and provides for renegotiation of the present agreement if the city reduces or eliminates diesel plant operation.

SEC RULINGS

Texas Utilities Co has received authorization for its proposal to amend its charter to restrict the right of its board of directors to amend the by-laws of the company in certain respects and to increase the number of the members of its board of directors from seven to nine. (Release No. 9335).

American Gas & Electric Co has received an extension of time on the disposition of the water properties and business of Citizens' Heat, Light & Power Co, Greenville, Ohio, from Sept 15, 1949, to March 15, 1950. In August 1948, American Gas, having acquired all of the outstanding securities of Citizens' Heat, Light & Power, was ordered to dispose of Citizens' water properties and business within one year from the date of acquisition. (Release No. 9336).

West Penn Electric Co's bond and common stock refinancing proposal has received SEC clearance. West Penn was authorized to issue and sell $31 million of sinking fund collateral trust bonds due Nov 1, 1974, subject to the results of competitive bidding, together with 856,895 shares of common stock (no par), or sufficient shares to provide a minimum of $18.4 million net. The Commission previously exempted the sale of the common stock from competitive bidding, and the clearance given was subject to the results of the negotiations for its sale. Of this stock, 468,621 shares will be offered to common stockholders on subscription rights, and 388,274 shares will be offered in exchange for preferred and class A stock (plus additional shares not subscribed for by common stockholders). Underwriters will purchase all shares not thus acquired. The terms of the subscription and exchange offers and underwriting will be filed by amendment after the results of competitive bidding for the bonds have been ascertained. Proceeds of the financing will be used to retire West Penn's $5,000,000 of 5% gold debentures, due 2030, at 105%, and such part of the preferred and class A stocks, at their call prices, as are not retired under the exchange offer. Part of the proceeds also will be used to acquire additional common stock of Monongahela Power Co, now held by West Penn Power. The financing will substitute commonstock and bonds for currently outstanding bonds and three classes of 6% and 7% preference stock. The sinking fund provisions of the bonds provide for their complete retirement at maturity in 25 years. (Release No. 9329).

Consolidated Electric & Gas Co, New York, has received authorization to issue a new $3.5 million promissory note to the Chase National Bank of the City of New York, bearing interest at 2¼% and maturing in one year. Proceeds of the borrowing would be used to pay off $3,650,000 of outstanding bank loans maturing Sept 20, 1949. (Release No. 9345).

Commonwealth & Southern Corp (Del.) and its subsidiaries have been granted permission to transform the Commonwealth system's present mutual service company, Commonwealth & Southern Corp (N. Y.), into an independent service company. The transformation will be effected through purchase by the parent of outstanding capital stock of the service company and its sale to certain officers and employees of the latter. Southern Services, Inc, has been approved as a mutual service company for the holding company system of the Southern Co (Release No. 9362).

Pacific Power & Light Co has been authorized to borrow another $2.5 million from Mellon National Bank & Trust Co, Pittsburgh, for construction purposes. At the same time SEC approved extension of the maturity date on $6.5 million of notes held by the bank from Nov 15, 1949, to May 1, 1950. Pacific P&L is to issue a new note to Mellon covering the entire $9 million, with an interest rate of 2½%. The further loan was necessary because American Power & Light Co, parent, found it impracticable to make an additional $2.5-million equity investment in Pacific P&L by Nov 15. (Release No. 9367).

American Gas & Electric Co has been given permission to sell 498,081 common shares, par $10, at competitive bidding. Stockholders of record Oct 7 may subscribe for new stock at the rate of one share for each nine held. Proceeds will be used to increase investment in subsidiaries and for other corporate purposes. It is expected that $20 million will be used to purchase additional common stock of Appalachian Electric Power Co, a wholly owned subsidiary (Release No. 9371).

Utility Operating Revenues Advanced 5.3% in August

Electric operating revenues of the larger privately owned electric utilities in the United States in August, 1949, were $364,491,000, compared with $346,012,000 in August, 1948, an increase of 5.3%, the Federal Power Commission reports.

Revenue deductions (including operating expenses, depreciation and taxes) were $292,365,000 or 2.7% over those of August, 1948.

Gross income, including other utility operating income, amounted to $75,019,000, an increase of 17.1% for the month. Net income was up 20.7% to $53,204,000 from the $44,083,000 reported for August, 1948.

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PSC Rejects Prepared Testimony in Rate Case

Prepared dialogue testimony in a telephone rate case was disallowed last week (Oct 13) by the Kentucky Public Service Commission. The action may set a precedent affecting electric utility rate hearings as well.

Counsel for the City of Newport, which is fighting telephone rate increases, argued it was unfair for an attorney and a witness to prepare written testimony in advance. His objection was sustained by Commission Chairman Robert M. Coleman.

FINANCIAL BRIEFS

Rights expire Oct 24 on an offering of 498,081 shares of additional American Gas & Electric Co common stock. Priced at $44.75, the issue is being offered to stockholders on a 1-for-9 basis.

Two proposed amendments to Connecticut Power Co's charter will be considered by stockholders at a special meeting Oct 24. One would permit unlimited increase in capital stock; the other would let the utility issue such stock without offering it to stockholders. Both actions would be subject to approval by the Public Utilities Commission and a two thirds vote of shareholders. Similar changes have been made by Hartford Electric Light Co.

General Public Utilities Corp has increased its quarterly common stock dividend rate from 20¢ to 25¢. It was paid Oct 14. The increase followed Securities and Exchange Commission removal of restrictions on the flow of income from Associated Electric Co, a subsidiary, and retirement of the latter's outstanding debt of $32,046,000 principal amount of 5% debentures.

A common stock issue of 239,601 shares to finance a four-year, $68-million construction program has been registered by Illinois Power Co directors. The stock would be offered to common stockholders at one for eight. The directors have voted a quarterly common dividend of 55¢ a share; former figure was 50¢ a share.

Omaha Public Power District has sold $5 million of electric revenue bonds due Feb 1, 1951 to 1979. About a fourth of the issue was placed at the first re-offering.

Gulf States Utilities Co, Beaumont, Tex., will issue 60,000 shares of $100-par preferred to 11 institutional investors at $101. New capitalization of the company will be 180,000 shares of $4.40 preferred, 50,000 shares of $4.50 preferred, and 2,461,299 shares of common.

Securities and Exchange Commission's order directing liquidation of the Philadelphia Co, Pittsburgh, as a public utility holding company has been upheld by the Federal Court of Appeals. Under the SEC order and court decision, the company must dispose of its natural gas and transportation properties but may keep its electric utility interests.

Electrical Output Moves Upward; Still Under '48

Although the electric output curve moved upward during the week ended Oct 15, 1949, the total remained below that recorded for the corresponding week of 1948. The amount of electrical energy distributed by the light and power companies of the country amounted to 5,480,735,000 kwhr, compared with 5,482,030,000 kwhr last year, this year's figure representing a decrease of 0.0%.

During the week ended Oct 8, 1949, the amount of electrical energy distributed totaled 5,449,897,000 kwhr.

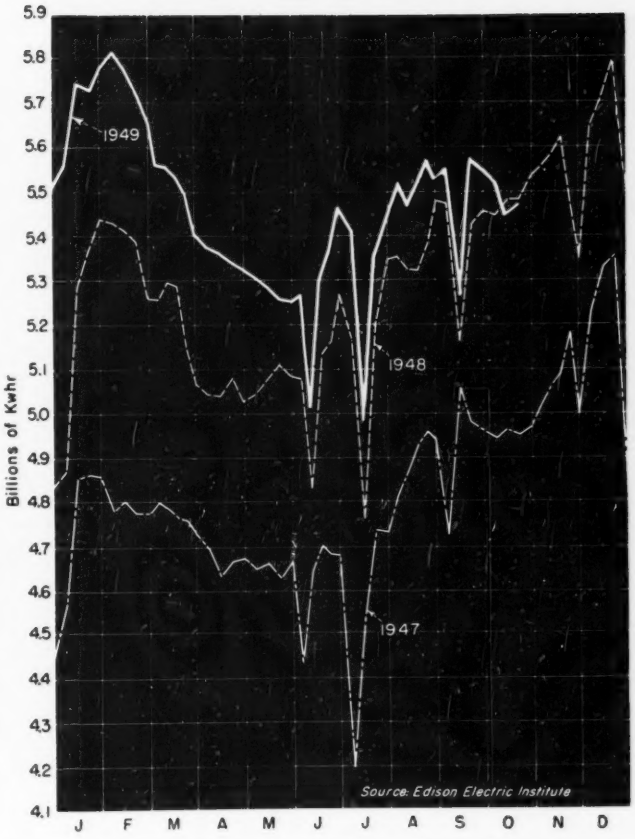
The Mid-Atlantic and Central Industrial states remained in the minus column, but the New England, South Central, Rocky Mountain, and Pacific States all reported increased gains over last year.

Weekly Output, Millions Kwhr

1949		1948		1947	
Oct 15	5,481	Oct 16	5,482	Oct 18	4,946
Oct 8	5,450	Oct 9	5,482	Oct 11	4,958
Oct 1	5,521	Oct 2	5,449	Oct 4	4,935
Sept 24	5,556	Sept 25	5,461	Sept 27	4,956
Sept 17	5,579	Sept 18	5,426	Sept 20	4,977
Sept 10	5,258	Sept 11	5,166	Sept 13	5,053
Sept 3	5,544	Sept 4	5,470	Sept 6	4,721
Aug 27	5,523	Aug 28	5,478	Aug 30	4,940
Aug 20	5,579	Aug 21	5,391	Aug 23	4,953
Aug 13	5,530	Aug 14	5,318	Aug 16	4,923
Aug 6	5,466	Aug 7	5,319	Aug 9	4,874
July 30	5,518	July 31	5,352	Aug. 2	4,806

Percent Change from Previous Year

	Oct 15	Oct 8	Oct 1
New England	+ 3.8	+ 1.6	+ 3.4
Mid-Atlantic	— 1.4	— 3.1	— 2.3
Central Industrial	— 9.5	— 8.5	— 4.6
West Central	+ 1.2	+ 2.5	+ 2.7
Southeast	+ 3.8	+ 4.0	+ 4.0
South Central	+11.3	+ 7.6	+ 8.8
Rocky Mountain	+ 3.8	+ 2.9	+ 6.9
Pacific Coast	+ 7.4	+ 5.6	+ 8.1
Total United States	— 0.0	— 0.6	+ 1.3



Congress Ups Salaries of Federal Power Officials

Pay increases of 50% or more have been voted by Congress for most federal power officials, along with other top-rung government administrators.

In the Department of the Interior, Secretary Krug's annual stipend jumps from $15,000 to $22,500; Under-Secretary Chapman, $10,330 to $17,500; Assistant Secretaries Davidson and Warne, $10,330 to $15,000; and Reclamation Commissioner Straus, $10,330 to $14,000.

Members of the Federal Power Commission, the Securities and Exchange Commission, and TVA's board of directors are all boosted from $10,000 to $15,000, while Rural Electrification Administrator Wickard goes from $10,330 to $15,000.

Total annual pay increases voted for 253 high government posts added up to $1,087,496.20.

MEETINGS

National Safety Council
National Safety Congress and Exposition, Stevens, Congress, Morrison, Sherman Hotels and the Palmer House, Chicago, Ill., October 24-28; Electrical Equipment Section, Stevens Hotel, October 26-27.

Southeastern Electric Exchange
Sales Conference, Biltmore Hotel, Atlanta, Ga., October 26-28.

National Metal Trades Association
Annual Convention, Palmer House, Chicago, October 26-28.

Pennsylvania Electric Association
Electrical Equipment Committee, Hotel Edison, Sunbury, Pa., October 27-28; Communications Committee, Benjamin Franklin Hotel, Philadelphia, Pa., November 3-4.

Edison Electric Institute
Transmission and Distribution Committee, Lord Baltimore Hotel, Baltimore, Md., October 31-November 1.

Institute of Radio Engineers-American Institute of Electric Engineers
Conference on Electronic Instrumentation in Nucleonics and Medicine, Hotel Commodore, New York, October 31-November 2.

National Electrical Contractors Association
Annual Conference, Rice Hotel, Houston, Tex., November 8-11.

National Electrical Manufacturers Association
Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., November 14-18.

Refrigeration Equipment Manufacturers Association
All-Industry Refrigeration and Air Conditioning Exposition, Atlantic City Auditorium, Atlantic City, N. J., November 14-18.

New Jersey Utilities Association
Annual Meeting, Seaview Country Club, Absecon, N. J., November 17-19.

Wisconsin Utilities Association
Joint Annual Convention, Electric and Gas Sections, Schroeder Hotel, Milwaukee, November 21-23.

Exposition of Chemical Industries
Grand Central Palace, New York, N. Y., November 28-December 3.

American Society of Refrigerating Engineers
Annual Meeting, Edgewater Beach Hotel, Chicago, Ill., December 4-7.

American Society of Agricultural Engineers
Winter Meeting, Stevens Hotel, Chicago, Ill., December 19-21.

National Farm Electrification Conference
Stevens Hotel, Chicago, Ill., December 20-22.

Plant Maintenance Show and Conference
Auditorium, Cleveland, Ohio, January 16-19.

Southwest Air Conditioning Exposition
Hall of Agriculture and the Poultry Building, Fair Park, Dallas, Tex., January 23-27.

American Society of Heating and Ventilating Engineers
Annual Meeting, Adolphus and Baker Hotels, Dallas, Tex., January 23-27.

WASHINGTON COMMENT

WILLIAM B. WHICHARD

GET BACK to your seats, folks. The curtain is going up any time now on the second act of "Let's Do Something for Leland Olds—at the Taxpayers' Expense. Of Course."

In case you missed the first act (EW, Oct 8, p 96), here is a brief fill-in on events to date in this touching drama. The hero, while awaiting approval by the Senate of his reappointment to the Federal Power Commission, had been caught in something of a swivet by the villains of the piece. The villains were named by writing-friends of the hero as "selfish interests, the oil trust, the gas trust, the power trust" or just plain horrid people, and included anyone who failed to beat the drums for Leland in his hour of great need.

Anyhow, these jokers learned that Olds had been talking with White House aides about a temporary job at National Security Resources Board. Tears were shed over the fact that Olds, a family man of no other visible means of support, had been without pay since his FPC term expired in June. All agreed—at the White House, at least—that it would be a fitting move to offer Olds another federal job, say as a consultant to NSRB, while he was waiting for the Senate to confirm him for FPC. It was a gesture that would have warmed the heart of every bureaucrat loyal to the Administration. It would have proved that the New Dealers take care of their own—even during a Fair Deal.

But certain Senators crabbed the act. They called Olds on the Senatorial carpet and wanted to know all about this business of taking a government job before they had decided whether he was fit for another. The hard-pressed Olds told them it was all a mistake—he never had accepted the NSRB job, never had worked a day at it. The Senators took his word for it, then rejected his nomination for FPC, anyhow. Seems they had other objections to the candidate, too.

So now the do-something-for-Olds act is on again, this time in dead earnest. There is little realism in that report the President will give him an interim appointment to FPC when Congress adjourns, however. That 53-15 crusher the Senate put on Olds' nomination is too much for even Truman to ignore. But the odds around Washington are 50-1, and pick the job yourself, that he will get some federal post.

This concern of the Administration for a long-time federal official ousted by an unappreciative Congress admittedly has its drama. There also is something of the incongruous about this particular instance.

Less than two years ago another of Truman's FPC appointees failed to win Senate approval. He wasn't voted down, as was Olds; his name never got to the Senate floor for debate. He, too, had children—three of them, all then under the age of 16, as compared to Olds' more mature offspring, two of whom have seen military service.

Burton Behling, of course, retained his position as special assistant to the Commission after his nomination was withdrawn by the President. But not for long. The FPC majority led by Olds became a reality in July, 1948. In three months, Behling had his walking papers. Family-man Olds apparently was not at all touched by Behling's family responsibilities.

TECHNICAL NOTES

ARCHER E. KNOWLTON

System expansion to serve growing load has occasionally been done at 8% outlay for reinforcement capable of handling five times as much load but such extreme opportunities are being exhausted.

Compressed distillation proponents claim 200 lb of distillate per 16 of fuel; central station evaporators produce 14 lb per lb of fuel.

A new thermodynamic cycle advocated by the Belgian Guarini employs compression of all turbine-exhaust steam for return to the boiler, the useful work being derived from energy applied to superheating the steam. Nothing but blowdown is discharged to the river.

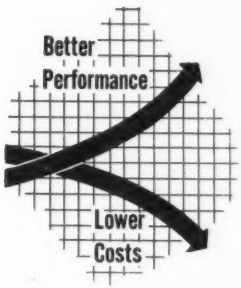
Pipe-line cathodic protection is usually designed on a 10-yr life for magnesium anodes and a 20–30-yr life of zinc anodes. Installations cost less than 1% of the value of a gas distribution system.

High-frequency heating may prove to have economic merit in preparing pipes of pipe-type cable systems for application of bitumen protective coating, as well as for oil pipe lines.

System expansion costs 1939–1949 took only one-fourth as much as if the outlay had been proportional to the growth in demand and output. A similar technical miracle needs to be done in the immediate part of the coming decade.

Personnel records in tabulating machine form save many staff hours of search, recollection and argument when questions of seniority, advancement aand transfer come up for discussion.

Reheat units installed during the twenties reportedly take longer to get on the line than straight-through superheat installations. Not necessarily true of current units.



Cutting Today's Costs

EXPENSES of operation are being pared by the power companies intensively and extensively. The diversified examples in this issue prove this. The realization that the pinch between costs and collections demanded action has snowballed in recent months, and the vigor of the drive to trim expenses is attested by the flood of letters and contributions received in response to a request for information on cost-cutting.

Many contributions report modification of administrative and divisional setups. Some report tangible gains from employee training programs, others simplification of forms and working procedures. Still others reflect sizeable economies in simplified and mechanized accounting.

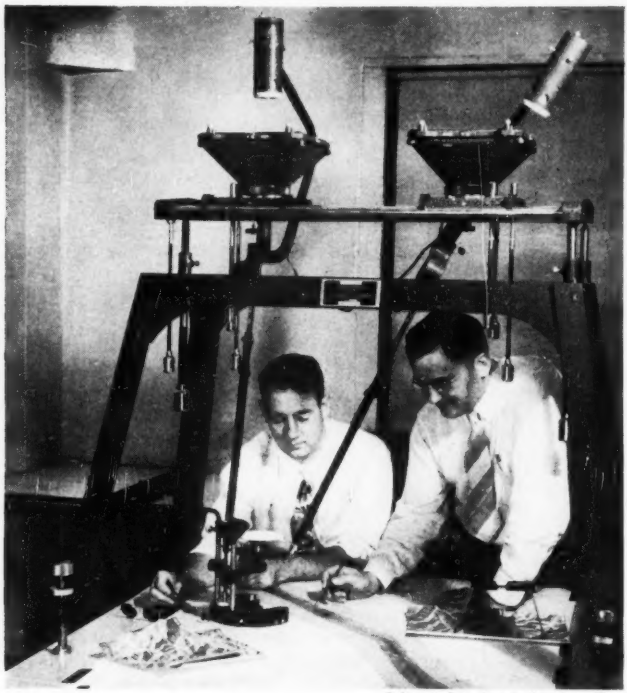
On the other hand many deal with savings effected by physical changes in the plants or the outside system. These have largely been chosen for the pages which follow, and further selection narrowed them to the items reflecting the most uniqueness, unconventionality, and diversity. The "non-physical" items have been converted to terse, thought-stimulating paragraphs interspersed among the more detailed articles.

Painstaking and comprehensive replies and contributions were received in answer to ELECTRICAL WORLD's request—a potent proof of the widespread appreciation of the need for cost control. So great was the response that only a fraction of the material can be incorporated in this issue. The items deferred will appear in subsequent issues and thus supply the eager search for methods and measures that get costs down and keep them down.

ELECTRICAL WORLD acknowledges the fine collaboration of the following utilities and constructors in compiling this "opening gun" fired at out-of-line costs:

Alabama Power Co
American Gas & Electric Service Corp
Attleboro Steam & Electric Co
Buffalo Niagara Electric Corp
California Electric Power Co
Central Maine Power Co
Central Massachusetts Electric Co
Cincinnati Gas & Electric Co
Cleveland Electric Illuminating Co
Columbus & Southern Ohio Electric Co
The Commonwealth & Southern Corp
Connecticut Light & Power Co
Consolidated Edison Co of New York, Inc
The Dayton Power and Light Co
The Detroit Edison Co
Electric Power Board (Chattanooga)
El Paso Electric Co
Fall River Electric Light Co
Florida Power & Light Co
Georgia Power & Light Co
Hartford (Conn.) Electric Light Co
Idaho Power Co
Indiana & Michigan Electric Co
Indianapolis Power & Light Co
Kansas Gas and Electric Co
Long Island Lighting Co
Louisiana Power & Light Co
Lowell Electric Light Corp
Malden (Mass.) Electric Co
The Montana Power Co
Narragansett Electric Co
New Bedford Gas & Edison Light Co
New England Electric System
New England Power Co
New Orleans Public Service Inc
Northern Berkshire Gas Co
The Ohio Power Co
Oklahoma Gas and Electric Co
Otter Tail Power Co
Pacific Gas and Electric Co
Pacific Power & Light Co
The Pacific Telephone & Telegraph Co
Parker-Schram Co
Philadelphia Electric Co
Public Service Co of Colorado
Public Service Co of Northern Illinois
Public Service Co of Oklahoma
Public Service Electric & Gas Co
Puget Sound Power & Light Co
South Carolina Electric & Gas Co
Southwestern Public Service Co
Toledo Edison Co
Union Electric Co of Missouri
United Illuminating Co
U. S. Corps of Engineers
Utah Power & Light Co
Virginia Electric and Power Co
West Penn Power Co
Wisconsin Power and Light Co

HERE'S HOW COSTS ARE BEING CUT TODAY



Robert A. Cummings Jr, Associates Photo

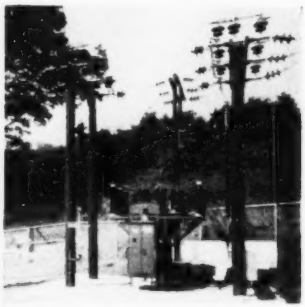
KELSH PLOTTER in use producing topographic and profile map of transmission line from aerial photographs. Overlapping photographic plates in holders atop machine are projected by polarized light on movable platten resting on baseboard of machine. Operator observes image with polarized glasses and by adjusting platten reads elevations on dial

Aerial Survey Yields Profile Of Line At Half Cost

USE of aerial survey methods, both to select the route and to produce topographical and profile maps from aerial photographs, is estimated to have saved West Penn Power Co 50% of the engineering costs on one of its new 60-mile, 132-kv lines. This line traverses rugged inaccessible country; to survey it and run a line of levels would take at least a year.

By aerial survey methods the line route was flown and photographed, from an altitude of 14,800 ft, on March 29 (before trees were in leaf). First profile maps were delivered one month after the photographs were made; the last ones two months later. The topographical and profile map, having 10-ft contours and a guaranteed accuracy of ± 5 ft, was produced with the aid of a Kelsh Plotter.

A rod and level check of certain spots showed the aerial profiles to be accurate to within 1 ft. However, this is regarded as "accidental" by the aerial survey firm. Work on this line has indicated that 10-ft contours are adequate for line construction.



ONE OF SIX self-contained breaker installations on Philadelphia 33-kv system that saved from 4 to 24% over conventional installations which are assembled in field

Self-Contained OCB Costs 15% Less

R. L. CATLETT
System Planning
Transmission & Distribution Section
Philadelphia Electric Co, Philadelphia

SELF-CONTAINED oil circuit breaker installations, like the one shown, have reduced the cost of automatic line sectionalizing breaker facilities on the 33-kv distribution system of the Philadelphia Electric Co an average of 15%. In the past, sectionalizing breaker installations at company substations had all their many facilities —relaying, control battery, station service and control house—purchased separately and assembled on the job.

The self-contained breaker has all facilities required for line sectionalizing assembled as a unit at the factory and shipped complete to the job. The unit consists of a standard outdoor breaker with bushing current transformer and rectifier-solenoid closing mechanism. Tripping is accomplished by the use of a capacitor trip device. On each side of the breaker the required lightning arresters and operating and relay transformers are mounted on shelves welded to frame uprights. Protective relaying, automatic reclosing, instruments and control are in a metal cabinet on one end of the breaker. Savings on each installation have varied 4% to 24%.

Recarbonated Cooling Water

SCALE FORMATION is practically eliminated on condenser tubes, by carbonating inlet cooling water with CO_2 from stack gases, in a scheme developed by Oklahoma Gas and Electric Co for two steam stations which draw condensing water from lakes, and formerly experienced considerable scale formations due to high concentration in water.

In operation, CO_2 is pumped from stack gases to the condenser intake wells and diffused through intake water. This procedure, with periodic applications of chlorine, has virtually eliminated scale in condenser tubes. It has resulted in savings exceeding $20,000 annually in cleaning costs and better economy, not including outage time previously required for cleaning.

JEEP-A-TRENCH cuts and rolls sod and digs a trench. It cuts construction time in half

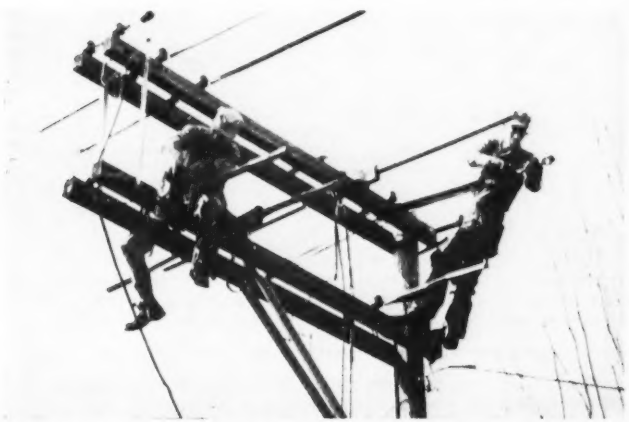
Jeep-A-Trench Cuts Underground Costs

UNDERGROUND WORK is done quicker and cheaper by The Dayton Power & Light Co with the Jeep-A-Trench. Made by Auburn Machine Works Inc, the machine cuts and rolls sod, digs a trench to the depth desired and has very good mobility between jobs.

The digging attachment is driven through the power take-off. Speed is variable from neutral up to 300 ft per hr; depth of trench is controlled by a hand wheel. Dirt is deposited on both sides of trench, leaving ample room for workmen in hole and simplifying the task of backfilling.

On an ornamental street lighting installation it was estimated that the job was completed in half the time that would have been required if trenches were dug manually.

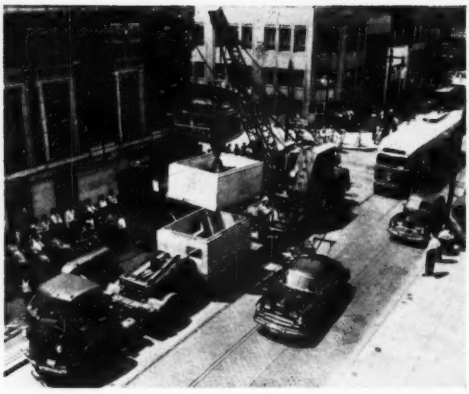
Increased Pole-Top Spacing Reduces Line Hazards



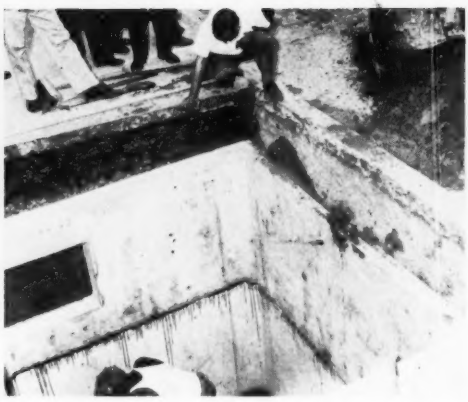
WITH 3-FT SPACING one lineman makes service connection; other man does another job

SAFETY AND ECONOMY were increased on Central Massachusetts Electric Co lines by increasing the vertical spacing between crossarms to 3 ft on a 4-kv changeover. The use of this spacing was largely determined by various local conditions, such as existing pole heights and clearances to other wires and to the ground.

Extra spacing has been found equally useful on regular installations not involving outrigger construction. The increased working space for lineman has lowered installation costs in a number of cases. Safety improvement is apparent from the illustration. The work was initiated by C. F. Barlow, superintendent of distribution for Central Massachusetts, and his assistant, Richard Waterman.



PRE-CAST sections are installed in hole dug by clamshell bucket



OPENING is located by rotating, inverting or transposing sections

Reversible Manholes Installed in Two Days

LEON G. KRAFT, Supt Estimating and Designing Section, Philadelphia Electric Co

INSTALLATION of pre-cast concrete manholes of reversible sectional design is fully completed by this company two days after paving is broken. These manholes, with inside dimensions of 6.5 ft width, 8.5 ft length and 8 ft headroom, normally require about six days for installation if field cast. In addition, pre-cast manholes offer greater structural strength with thinner walls, due to greater accuracy in placing reinforcing steel and ability

Mechanization Brings Efficiency In Accounting

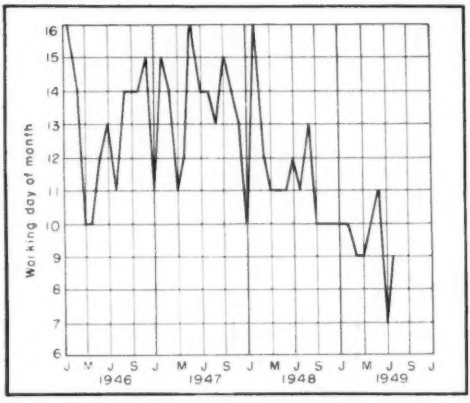


FIG 1—ONE BENEFIT of mechanized accounting is reduction of time required to prepare reports which are used by management

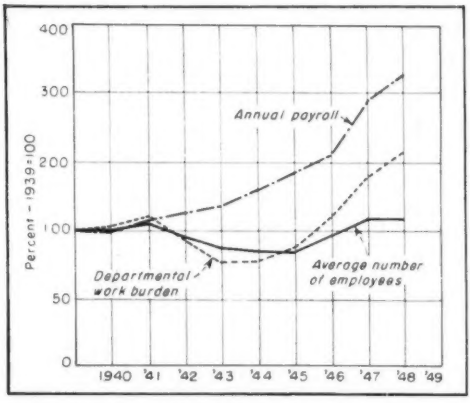


FIG 2—NEED for mechanized accounting was shown by increase in work. Number of workers needed shows efficiency of new procedures

Pride in individual preferences is the greatest single obstacle to deriving inherent economies in standardization.

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Bare conductors where no restriction exists, cut cost of line and poles because of lesser ice and wind loading.

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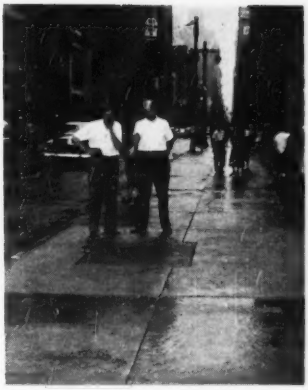
Conforming to simplified standards for distribution transformers has benefitted one utility 15%.

ROOF SLAB is lowered into proper position

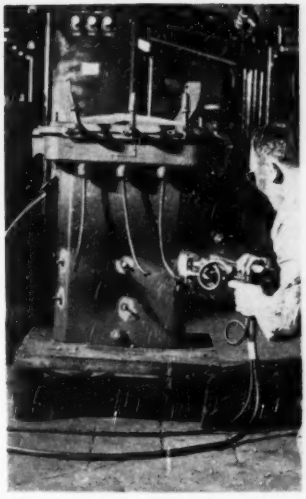


COMPLETED manhole 50 hr after job began

to obtain denser mixture of concrete.

The manhole shown consists of two wall sections and a roof slab, all of which can be placed in normal or inverted positions. Each section weighs about five tons and is cast in the same form. One section contains two openings in adjacent walls; the other section is solid. The section with openings can be turned 180 deg. inverted, or transposed vertically with the solid section to provide two elevations of the openings, with four different locations at each elevation. Thus, in effect, two openings permit 16 different locations for conduit connections.

The roof slab weighs four tons and is reinforced to withstand roadway loads in cases where the manhole extends beyond the curb.



Morton Gregory Corp Photo

Procedure

S. J. SCHIML
Supervisor General Accounting Dept
The Dayton Power and Light Co

FOLLOWING World War II, development of a complete manual of accounting procedures served to crystalize and clarify The Dayton Power and Light Co's accounting methods. Thus, new employees made the transition from trainee to productive employee faster and easier. Operating district personnel obtained clearer understanding of their part in providing data required for accounting.

Reorganization of the Accounting Department along functional lines and improvement of the quality of supervision were the second step taken toward modernization. As a final result of these two steps, the entire flow of work through the accounting sequence was streamlined into efficient procedures. Integrated with the use of modern machines, these procedures have produced favorable results. As illustrated in Fig 1, it now takes only seven working days, instead of the former 16, to compile the results of company operations.

Fig 2 shows the growth of work burden in general accounting operations since 1939. Using the 1939 figure as an index (100), statistics were predicated upon such work burden factors as number of invoices processed, number of cash vouchers compiled and total number of company employees. This chart also shows the effect of integrating mass accounting transactions into modern accounting machine procedures.

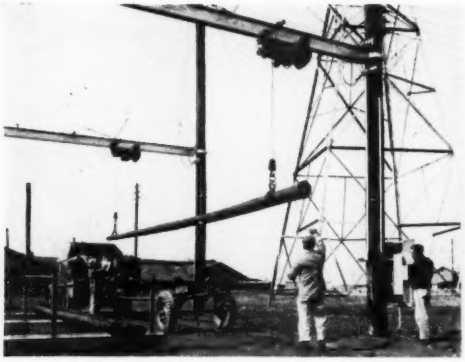
Arresters Installed On Transformer Reduce Cost

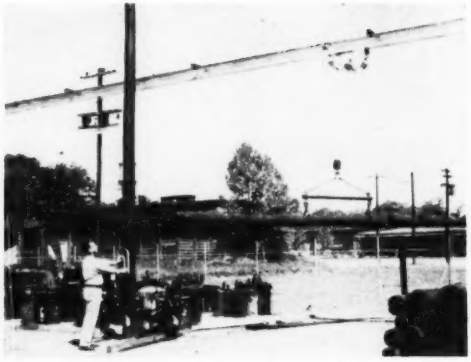
LIGHTNING ARRESTERS are being installed on transformer cases, before the transformers are raised to position, by Union Electric Co of Missouri. Fittings to take arrester brackets are welded to transformer cases in company shops.

Estimated savings range from $2 to $4 per installation. This saving grows as transformers are reinstalled at new locations because arresters remain with the transformer for the life of arrester or transformer. This practice also keeps arresters as close as possible to the transformers they are protecting.

External combustors (cyclone furnaces) offer economy in the sense that soot-blowers and deslagging means are far less necessary. They may also permit omission of the I-D fan wherever pressurized furnace operation is warranted.

The surest way to hold down system cost per kw of generating capacity is to add the largest feasible unit consistent with system economics and interconnections. Incrementation is costly unless dictated by other factors.





POLE HANDLING EQUIPMENT installed at Montgomery (left), Mobile, and Selma (right) permits safe and quick operations

Travelling Hoists Cut Pole Handling Costs

REDUCED COSTS, together with safer and easier handling of poles of any size, is achieved by use of travelling I-beam hoists. Equipment was designed by E. W. Robinson, operating vice-president, Alabama Power Co. Installations have been made at Montgomery, Mobile and Selma.

The Montgomery installation has two 2,000-lb Electrolift hoists with 4-hp, 220-v, 3-ph motors, providing a 20-ft maximum lift at 40 ft per min. Control is on one support pole.

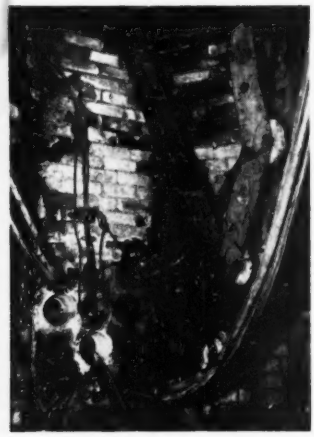
Two 10-in., 25.4-lb I-beams are suspended 18½ ft above ground. They are 72 ft long, spaced 30 ft apart. I-beams are supported by guys, with pole bands joining beam to the poles. Guys are attached by suspension clamps and clips every 9 ft with turn-buckles for adjustment.

I-beams extend over rail siding so that poles can be picked up and moved to concrete storage rack. Installation has capacity of about 200 poles and cost about $4,500.

The Mobile installation consists of two 100-ft I-beams and two Electrolift hoists and has capacity for about 300 poles. It cost about $5,500.

At Selma, where there is no rail siding, a single 91-ft I-beam and Electrolift hoist was installed to handle both poles and transformers. The hoist has 4,000-lb capacity, requires a 6½-hp motor and has a lift of 20 ft. Spreader bar with two pole tongs stabilizes the load. Control box is on pole near the driveway. Other features of this installation are the same as at Montgomery. Cost of Selma installation was about $2,500.

Control cable between support poles at Montgomery is underground in conduit. Other installations use open wire on racks to reduce cost and eliminate troubles of underground installations.



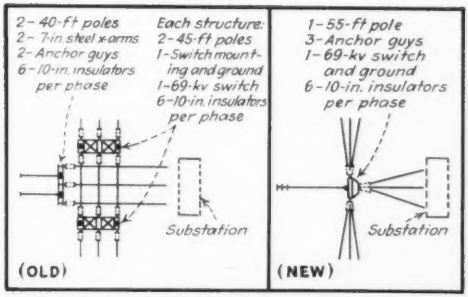
"Around-The-Corner Puller" Eliminates Cable Splices

WAYNE A. PARKER
Chief Electrician, Oklahoma Gas and Electric Co, Oklahoma City

SEVERAL SETS of splices were eliminated by using what was dubbed an "around-the-corner puller" for drawing cable around corners in manholes. In use the device is placed between duct openings in adjacent or alternate manhole walls and guides cables around the corner on hardwood rollers.

Length of the puller is readily changed by adding or subtracting steel sections. Angle of the puller can be adjusted by increasing or decreasing the angle between each section by means of holes in the side plates. The device is quite stable and requires little bracing.

As illustrated, the "puller" was also used to remove cable from manholes without damaging it.



NEW TYPE CONSTRUCTION reduces the use of many of the costly component parts necessary for old type construction

SWITCH TAP at 69-kv substation take-off, mounted on single pole, simplifies construction and decreases erection time

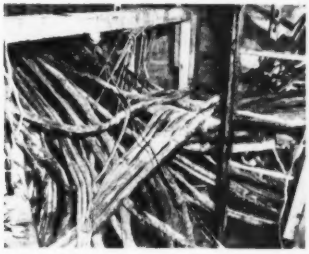
Substation Switching Cost Reduced

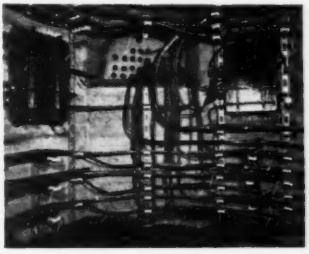
C. W. WARNER
General Superintendent
Georgia Power and Light Co
Valdosta

SIZEABLE cost reduction was realized at Georgia Power and Light Co's Adel substation air-break-switch tap by simplifying the structure and incorporating a new type of disconnecting device. A new concept in gang-operated air break switches, the device was developed by company engineers in cooperation with W. M. Matthews Corp.

The unit consists of two vertically mounted, three-pole, gang-operated air break switches mounted on common bases, each having independent operating mechanisms. This construction eliminates five poles and materially reduces overall construction time and cost.

Tap to the substation is connected between the switches; thus, sectionalizing points are provided on either side of the tap. The new switch permits installation of high voltage switching equipment along city streets or in congested areas.





Models Facilitate Retraining in Underground Work

THE USE of scale models has been adopted by the Underground Department of Toledo Edison Co for planning the retraining of cable in enlarged manholes. They are used only on large jobs where such retraining cannot be visualized by the workmen (left and center).

This technique has greatly reduced the time needed for such work. In addition, these models assure a neat and orderly appearance (right).

Arrangement of facilities is almost as important as their provision if manpower is to be most effective. An example is centralization of control in power plants. Incidentally, size and cost of building structure is often reduced at the same time.

Five cents per ton is a typical saving from use of earth moving equipment for storing, shifting and reclaiming coal as compared with massive trestles, cranes and trackage. The scrapers and bulldozers also compact the coal and minimize spontaneous fires.

CARBOLOY TOOL bores shell prior to installation of new inserts in diaphram ledges

Turbine Repairs Made on Spot Shorten Outage Time

WHEN TROUBLE developed in a turbine due to excessive wear on diagram ledges, Dayton Power & Light Co built a cutting tool which held outage time to seven weeks and reduced cost of the job as well. Otherwise the turbine would have been out of service five months, the time estimated by the manufacturer as necessary for factory installation of new inserts.

The device developed for machining out the old ledges right in the power plant is a carboloy tool on the end of a holder which turns at the rate of only 4 rpm. It is adjustable parallel to or at right angles to the axis of the turbine.

Two shifts worked three weeks boring out the old ledges and another two weeks machining the groove. Finally, two weeks were required to install the new inserts and put the turbine back in service.

Reclaiming Transformer Oil Saves Two-Thirds

TRANSFORMER OIL which has deteriorated to where it is unfit for further use is reclaimed by Alabama Power Co at approximately one-third the cost of new oil.

Three years ago a plant was installed using hot agitation under vacuum in conjunction with an activated clay. Quality of the reclaimed oil produced appears satisfactory. Insulation resistance readings of transformers filled with it are comparable with readings of same transformers filled with new oil. Experience indicates that a reasonable life of this oil can be expected.

Alabama Power Co is reclaiming approximately 100,000 gal of oil per year. No old oil is thrown away and new oil is bought only for make-up.

Portable fans are fine adjuncts to help transformers carry overloads if they can be available and applied in readiness for the expected excess.

•

Capacitors can do almost everything synchronous condensers can do and at substantially lower cost. If the capacitors lack the characteristics required the synchronous condenser will probably be found appropriate.

•

If, as and when a piece of equipment necessitates repairs, there is no better time to make sure its retention will not be less wise than junking and replacement.

•

Truck-mounted pumps, filters, etc make much fixed oil-piping and elaborate reclaiming installations unnecessary; building space has also been saved.

•

If automatic air-break switches do everything required of them from a service standpoint, why use breakers?

•

Automatization of substations supersedes attendants with fewer travelling maintainers and supervisors.

Mobile cranes are setting poles fully assembled on the ground with guys, airbreak switches and hardware.

•

It seems that it should be possible to modify the truck-loader type of conveyor so that it could do trench digging.

•

If courage is lacking to adopt one-boiler-one-turbine for the initial unit in a new plant, it ought to be safe to do it for subsequent units and save cross-over piping, etc.

•

One time-saving way to fix transmission line tower locations is to use walkie-talkies in conjunction with vertical flashlight-beams at dusk to identify the spots chosen.

•

Glass blocks and louvers are taking the place of sash in plants where better ventilation makes windows far less necessary. Maintenance is reported to be materially less even if building cost per kw is hardly any different.

•

One sure way to accomplish economy in distribution spending is to use the highest practicable feeding voltage. The same is true of transmission—it's a basic law.

Tractor Trailer Is Its Own Ramp

TRACTORS, bulldozers and similar slow-moving construction equipment used by Cleveland Electric Illuminating Co is speeded from job to job on the tilt-bed trailer shown. Releasing a hydraulic cylinder in the trailer's hinged towing section, or "tongue", tips the bed down to form a ramp. Pumping up the cylinder returns the bed to the horizontal. Time to load the tractor shown was about 3 min. In contrast, the old method of using improvised ramps to load equipment took up to an hour.

TILTING TRAILER becomes a ramp to allow fast loading of heavy construction equipment

Straddle Truck Used for Cable Installation

M. KARP
Assistant Engineer
The Pacific Telephone & Telegraph Co

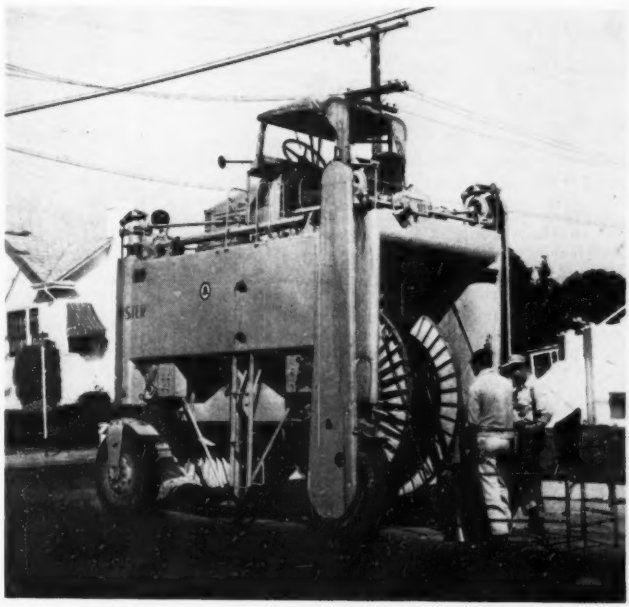
TO AID in their current extensive construction program, The Pacific Telephone and Telegraph Co has adapted a straddle truck for use in underground cable work. This type of vehicle is observed frequently transporting lumber.

Two reels of cable, weighing up to 7½ tons each, can be carried on spindles which fit into V-shaped saddles attached to the load tray. The 9-ft turning radius permits the unit to be maneuvered with ease either within the cable reel yard or at a manhole.

When used for pulling-in cable, a winch mounted between the reels of cable is used for drawing the pulling-in line into the conduit section from a construction truck at the far manhole. The cable on the straddle truck is attached to this winch line and pulled into the conduit. The straddle truck may also be used for pulling underground cable directly out of a section of conduit on to a steel cable reel powered by the propulsion motor. Maneuverability of the unit is particularly advantageous in that it may be driven directly up to, or over, an open manhole. Economy of space is also a consideration where crowded conditions make it awkward to use the standard truck and trailer.

Auxiliary equipment added to the conventional (unreinforced) unit includes:

1. A single drum winch, with a divided drum, mounted on angle brackets between the cable reels.
2. Cable reel spindle saddles fabricated from steel bar stock and bolted to the load tray.
3. Roller chain and a demountable cable reel drive sprocket for use in cable removal work.
4. A winch line guide installed on the upper rear of the unit.



CABLE REELS weighing 7½ tons are carried by space saving, maneuverable straddle truck

Temporary "Built-in" Track Saves Double Handling

DOUBLE HANDLING of 1,200 tons of boiler material was avoided during construction of Gadsden Station by extending the railroad track 200 ft so that it terminated in the middle of the proposed boiler room. Material was hoisted into place by regular station crane.

Savings are conservatively estimated at $12,000 for unloading and handling all material and equipment. About 21% in man-hours was saved during installation of two 600,000-lb boilers. This example of careful construction-planning was reported by F. C. Weiss, vice-president of engineering and construction, Alabama Power Co.

Too often the uncertain reliability of equipment of two or more decades back led to bolstering by duplicate buses and switching. Except for minimizing maintenance there is no reason to rip out the duplications but there is less reason now to repeat the extravagance.

•

Several utilities are following the practice of omitting the circuit breakers on the high side of transformer banks. The protective apparatus at the source end of the line suffices with transformers as reliable as they are today.

•

Utilities are likely to be increasing costs for themselves by insisting on comprehensive sample testing in their purchase specifications. Statistical quality control is less expensive and equally assuring.

•

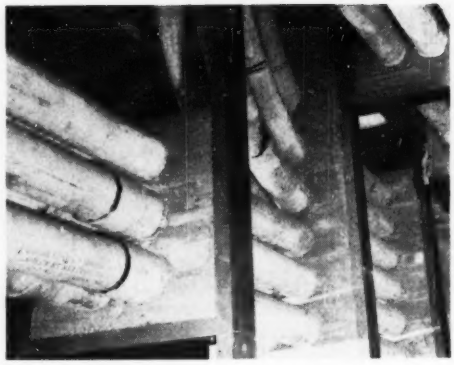
Secondary conductors probably add up to more mileage than do primaries and that is a cogent reason for choosing a size and a conductor material entailing the lowest average annual cost over a term of years.

•

Coal-chute and gate corrosion was met by one company that switched to stainless-steel clad plates which gave five times the life of ordinary carbon steel.

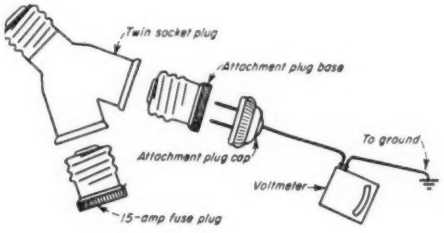
•

Damage which could prolong outage and add to maintenance and operating costs has been minimized for utilities that have installed high-speed tripping relays and fast tripping oil circuit breakers.



Support Asbestos Conduit In Concrete Hangers

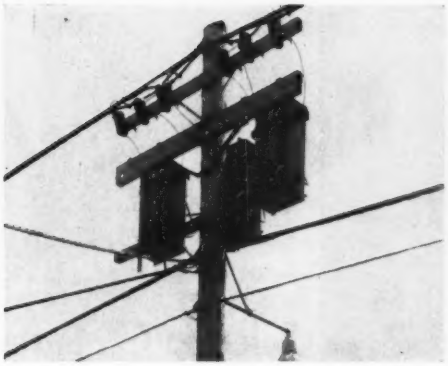
ASBESTOS CONDUIT in the Ashley Street Plant of Union Electric Co of Missouri is supported in "concrete hangers". Reusable forms, held in place during pouring by means of C-clamps, simplified installation. Supporting channels are shaped and welded as necessary and also serve as part of the concrete forms.



Remove fuse plug from service panel and insert double socket plug

Taking Voltage Readings on Dead-Front Service Panels

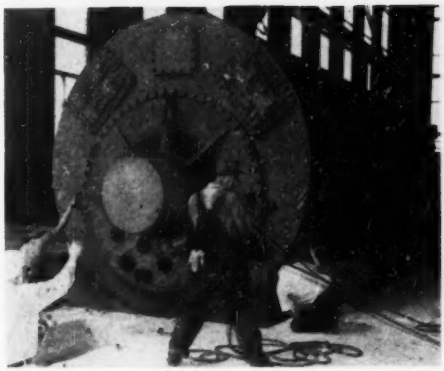
P. S. SHELTON, Narragansett Electric Co, Providence, R. I., solved this problem effectively by inserting a double-socket plug in the service panel, thus connecting a portable voltmeter across the circuit, one instrument terminal being grounded as shown. This simplifies and speeds up such tests on customers' premises equipped with modern panels. Reinserting the fuse in one branch maintains the circuit.



Aerial Cable Reduces Cost

W. H. RUSSELL
Electrical Engineer
U. S. Corps of Engineers
Portland, Ore.

AERIAL CABLE for primary, secondary, street lighting and service drops for a small group of electrically heated apartment houses at Bonneville dam cost $10,000 less than an underground system. Each two-apartment unit requires a diversified demand of 30 kw.



Pre-balanced Turbogenerator Installed 25% Faster

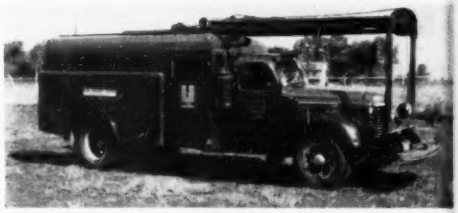
APPROXIMATELY ONE-FOURTH less time was required by Alabama Power Co for field erection of the generator end of a 60,000-kw unit by use of a prebalanced generator shipped complete with stator. This was reported by F. C. Weiss, vice president of engineering and construction.

Permanently Mounted Booms Cut Construction Costs

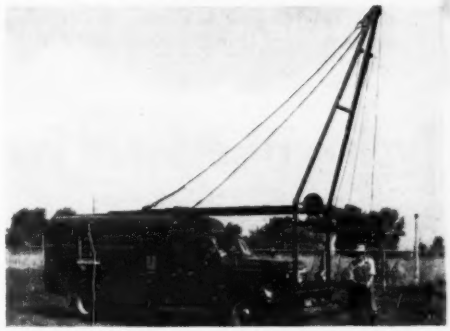
BOOMS, of suitable capacity, permanently mounted on construction trucks have effected considerable saving in Public Service Co of Northern Illinois operations by replacing large truck-mounted crane or rigging equipment on the job. Their application, of course, is limited by their capacity—3,000 to 7,500 lb for the front-mounted type. Same type of boom has been used for rear mounting for handling heavier loads. For handling loads of 3,000 to 7,500 lb, the front-mounted boom is preferred because the driver can operate it without changing his position. When engaged in lifting and moving, the truck can be maneuvered readily into position to pick up equipment from a trailer, carry it to the site and place it in position.

The single-drum type winch which operates the boom is mounted immediately back of the bumper. Boom is raised by throwing load line over large sheave on shaft of fulcrum point of boom, and anchoring end of line to an eye on frame of winch. When power is applied, boom is lifted from its resting position to working position.

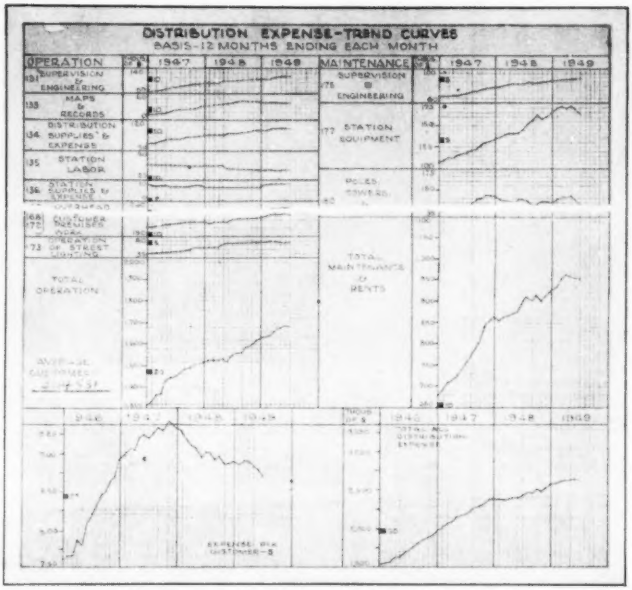
Work is going forward at the present time to equip the truck with a second small winch which will operate the back guy lines to change the angle of the boom.



BOOM FOLDS back over the roof when not in use. For handling moderate loads—3,000 to 7,500 lb—front-mounted boom is preferred. For handling heavier loads, rear-mounted boom is used



FRONT-MOUNTED boom permits operator, without changing his position, to maneuver truck readily to pick up equipment from a trailer, carry it to the site and place it in position



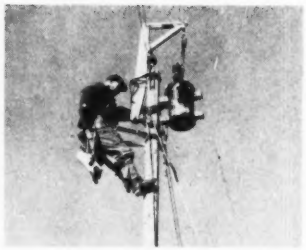
SYSTEM-WIDE expense-trend curves for distribution are compiled from individual graphs for each geographical district. They enable general supervisors to attend to those items out of line

Tracking Down Out-of-Line Costs

SYSTEM-WIDE expense trends can be more accurately gaged by compiling the overall expense graph from individual trends of a company's geographical districts.

Distribution costs, for example, are affected by so many diverse elements tending in different directions and involve so many different people and sub-departments that it is often difficult to make progress in cutting or controlling costs. One is unable to tell accurately what is out of line.

To correct this situation, one utility issues graphs each month showing 12 month-ending figures for various elements of distribution costs. These include one graph for each of five divisions and an over-all graph for the entire company. Now everyone concerned watches the expense items for which he is responsible, and it is not difficult for general supervisors to attend to those items out of line.



GIN is applied without moving energized line

Pole-Top Gin Saves Installation Time

L. B. EDSON
Overhead Line Foreman, and
JOE WHEELER
District Garage Mechanic
Indiana & Michigan Electric Co
Benton Harbor, Mich.

A LIGHT COMPACT GIN has been constructed which one lineman can easily place in position on top of a pole. With this gin, transformers can be installed in approximately one-half the time previously required because the hot conductor does not have to be moved. In addition, no assistance is needed, other than from groundmen. Consequently a very substantial saving in installation cost is made.

The gin is used in mounting distribution transformers up to 25 kva on 6,900-v pole-top-pin lines. It has an over-all height of 5 ft. Upright member is $1\frac{3}{4} \times 5\frac{1}{2}$ in., made of wood; horizontal member is $1\frac{1}{2} \times 2\frac{1}{2}$ in., made of $\frac{1}{4}$-in. metal straps welded to spacers; and brace is $1\frac{1}{2} \times 2\frac{3}{4}$ in. wood. Cost of construction was $15 for material. Gin folds for storage.

Typing Time Saved For Cost Statements

THROUGH a simple change in typing procedure, statements of accounts, such as construction expenditures, are available a couple days earlier in an eastern utility. The statements are prepared in approximately 5% less time by using black figures in parentheses, instead of red figures, for the over-expenditures. In addition, a saving in cost is made by the elimination of red carbon paper.

In the former typing operation, red carbons had to be substituted for black carbons between the statement forms after all black figures had been typed. The remaining data was then typed in red on the original statement and all copies. Eliminating the use of red figures has meant an average saving of 30 sec per page.

Only a short time is needed to become acquainted with statements having over-expenditures represented as black figures in parentheses.

Florida Cuts Costs

SELECTED from an imposing list of cost reduction practices reported by Florida Power and Light Co are:

Use of sidelift pole truck to set poles.

Use of specialized crews for pole and anchor work.

Materials on hand are used whenever possible to avoid increase in inventory, such as paralleling two 7½-kva transformers rather than purchasing a new 15-kva transformer.

System load is divided among generating units on most economical basis as determined by loading study made by Ebasco Services Inc. Large savings result because of differences in efficiency, fuel cost, and transmission losses between loading schedules.

Quick emergency starting of small standby plants from cold condition is now provided by gasoline-engine-driven fuel-oil pumping units developed and constructed in their shops.

Regenerative air heaters are being cleaned while in service by washing with a high pH water solution to reduce corrosion. Alkaline coating left on surfaces increases element life.

PUSHBROOM PAINTING decreases time by one-third with little increase in paint losses

Push Broom Painting

FACED with the maintenance of miles of wire fencing around substations, Electric Power Board, Chattanooga, Tenn., devised a method which saves one-third in time with no appreciable increase in paint losses.

The job is accomplished by a three-man crew. One man, using a heavy fibre bristle brush, removes dirt and rust from the wire. Two "broom painters" follow, one on each side of the fence, spreading the aluminum-lead paint with brooms of the soft janitor type. Shallow rectangular shaped pans, which can be slid along, hold the paint.

Subox aluminum-lead thinned with Subox thinner, to which has been added Rust Arrest, is used as the protective coating.

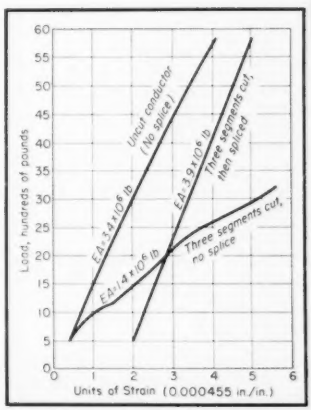
Preformed Armor Rods Speed Conductor Repair

ONE MIDWESTERN utility repairs breaks in stranded conductors on transmission lines easily and quickly by using Preformed Armor Rod. On one particular line strung with 200-Mcm, seven-wire, hard-drawn copper conductors, advantage was taken of an unexpected shutdown by a large consumer to repair conductors and do other maintenance work.

Inspection revealed conductors with one to four strands broken under clamps, and additional damage between towers from lightning and flashovers. Rather than remove old conductor and splice in 100-ft sections at each break, it was decided to apply 72-in. lengths of hard-drawn bronze armor rod. Average time for repairing a conductor was 3 min. Cost was reported to be a small fraction of the cost of splicing.

Accompanying load-strain curves, for a HH, 250-Mcm, seven-wire copper conductor, indicate the condition of broken conductor covered with armor rod. Original modulus was 3.4 x 10^6 and tensile strength 10,800 lb; with armor rod applied over three broken strands, modulus rose to 3.9 x 10^6 and breaking strength to 10,900 lb.

In another case, a Western system has had 25–30% of their conductor supports develop outer-layer breaks in a relatively short time. To remedy this situation it is now formulating plans for applying armor rods on hot lines using very simple techniques.


Load, hundreds of pounds
Units of Strain (0.000455 in./in.)
Uncut conductor (No splice)
EA=3.4 x 10^6 lb
EA=3.9 x 10^6 lb
Three segments cut, then spliced
EA=4 x 10^6 lb
Three segments cut, no splice

HIGH NOZZLE PRESSURE and excellent mobility of this spray rig have given chemical control of woody growth on right-of-ways at one-third the cost of hand cutting and burning. Four men handle two 100-ft hoses while a fifth drives the truck slowly along the line

Right-of-Way Cleared by Chemicals At One-Third Cost

E. W. CONROY
Supt of Transmission
Puget Sound Power and Light Co
Seattle, Wash.

CHEMICAL CONTROL of weedy growth on transmission right-of-ways costs about one-third as much as hand clearing. This is the opinion of Puget Sound Power and Light Co after three years of experience with spray treatment of heavy vegetation.

Chemical control was resorted to because cutting and burning were not satisfactory. Within a year new stump growths of willow, alder and maple covered patrol trails and hindered patrolmen in seeing the line. Within three years the growth interfered seriously with communication circuits.

In the first year, results of chemical clearing by a contractor fell short of his claims, but they did show definite possibilities.

Although the first spraying by Puget Sound was done with a powdered salt form of 2,4-D, the company has since found that Esteron 44, a liquid compound containing 44% active 2,4-D with a wetting agent, is more effective and easier to use. It clings to plant foliage better than the salt form and is not harmful to animal life or corrosive to equipment. For spraying it is diluted with 400 parts water, with which it mixes easily.

High pressure is required for better penetration of dense growth. Thus the company is using the equipment shown. Actual working pressure of about 400 lb is obtained from a spray pump rated 25 gpm at 700 lb pressure, and driven by a 16-hp, 4-cyl gasoline engine. The compact unit is mounted on steel skids along with a 300-gal steel tank and is transported by a two-ton truck.

In operation a sump pump is used to fill the tank from streams and drainage ditches. This season a five-man crew using this rig covered 200 acres in 22 days, using 28,650 gal of spray.

For initial sprayings in areas where there is a convenient water supply and fair roads, the cost may be as low as one-tenth the cost of cutting and burning. However, it is probable that areas needing cutting and burning every five years will have to be sprayed three or four times in the same period, bringing the cost up to one-third. Since it is practically impossible to cover every bush and seedling and so obtain a 100% kill, areas must be resprayed the second year, then every other year to kill regrowth caused by seeding. Other costs include hand work, such as cutting in inaccessible areas where spray cannot be used or where crops along the right-of-way might be destroyed by drifting spray.

Any way of freeing frozen coal is worth considering because the brute strength method is expensive and ineffectual. Prevention in this field is worth many pounds of the hammer. Three pounds of calcium chloride to the ton have proven helpful but watch out for corrosion.

•

Aluminum sheets (7 mm) formed into tapering cones are Norway's prospective answer for less expensive 75-ft transmission towers.

•

Decisions to use cable without lead sheath for economy's sake are wise if they are founded on thorough canvass of surface leakage and the quality of the conductor insulation.

One-line diagram planning and analyses of stations and substations is an approach which brings out the merits and limitations of any proposed complexity and converges toward the simplest feasible layout.

•

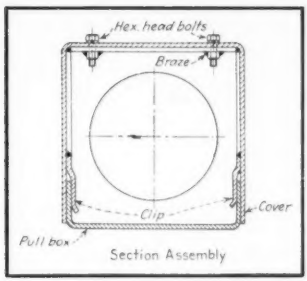
Requisition forms and procedures are probably unduly refined and expensive if they necessitate a lot of bookkeeping and paper-work to get 25 meter-bearing balls out of the stockroom for the meter repair group.

•

If a crossarm is not needed for conductor or transformer support, it should be possible to hang arresters and cutouts on brackets and dispense with the arm.

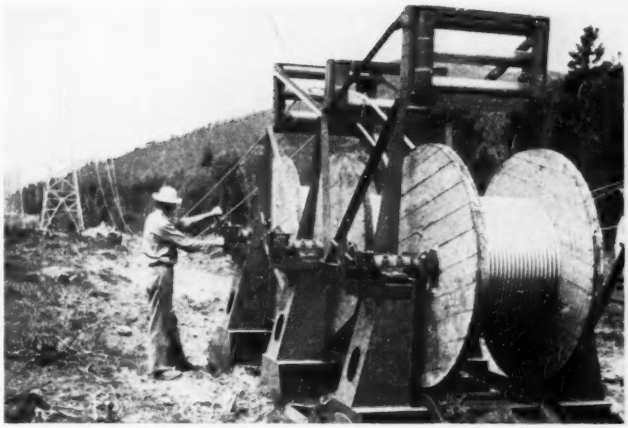
Simplified Pull Box Saves Labor

COMPARED to the standard commercial type box, a specially designed pull box (1) saves in cable installation cost because of complete accessibility when cover is removed; (2) keeps electricians happier because it facilitates handling of cables and eliminates cable sheath damage caused by pull boxes with sharp edges and corners; and (3) saves labor required to remove and replace cover. (This box cover has only four bolts—two on top and bottom.) Box



PULL BOX has extreme accessibility when cover is removed. Side clips and four bolts—two on top and bottom—hold cover in place

and cover are fabricated from No. 11 gage sheet steel. Cover clips are spaced approximately 9 in. along each side of cover to suit length of pull box. For boxes $2\frac{1}{2}$ in. and smaller, $\frac{1}{4}$-in. bolts are used; boxes 3 in. and larger use $\frac{3}{8}$-in. bolts. Idea was suggested by a southern utility.



SAVINGS of more than $1,000 per mile are effected by reel tension sled used in Pacific Northwest. Three sleds require one tender instead of 12 and also reduce size of lagging crew

Reel Tension Sled Cuts Stringing Costs

USE of a "reel tension sled" for stringing transmission line conductor is effecting savings of more than $1,000 a mile for Parker-Schram Co of Portland, Ore. One reel tender can handle as many as two three-reel sleds and one single-reel sled. Improved control of tension to keep cables off the ground effects further savings by reducing size of lagging crews.

The sled consists of a welded steel framework mounted on tubular skids arranged to hold three cable reels in tandem. Full reels are rolled into place along a built-in track. A hydraulic lift below each reel position enables one man to raise and lower the reel with ease.

To maintain tension when reels are unspooled, each reel is provided with a manually controlled friction brake. Overhead ball bearing rollers guide the outgoing cable.

Parker-Schram has used the two three-reel and one single-reel units in stringing some 60 miles of 230-kv line. The initial stretch of 15.78 miles over the roughest terrain in the entire Bonneville power system was completed in 45 days.

Circuit breakers with limited rupturing rating can often be assigned heavier duty by choosing relays which, however, will limit the duty to tolerable magnitudes.

•

Most states have now sanctioned a 96-month meter test period. There is potential and justified saving for those utilities that can secure similar permission.

•

Buried or racked forms of control cable usually are less expensive than conduit systems.

•

Time and manpower can be saved by using color-coded wire in switchboard wiring because each conductor can be identified and traced so readily.

•

Factory assembly of equipment offers tangible savings—provided each job is checked to make sure that dismantling for shipment does not entail most of the work involved in a completely unassembled job.

Concrete that has flyash added in the proportions of 1 to 5 of cement has a minimum strength of 3500 lbs per sq in after 28 days of ageing according to a utility that has adopted the practice.

•

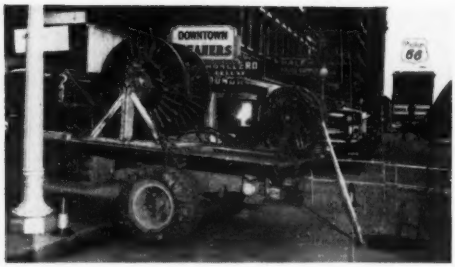
Power-driven pole-hole diggers have reduced the cost of digging by half for one utility. Dynamite blasts holes in rural areas at less than 20% of the cost of hand-digging.

•

Some utilities have found that interconnection of subtransmission to take advantage of load diversity can avoid provision of additional transformer banks, reduce system losses and afford better operating flexibility.

•

Substation buildings of a former era can usually be shrunk to mere housings adequate for sheltering control panels, battery and instruments.



PULLING RIG enabled one utility to remove and re-reel 3,773 ft of 3/C, 4/O cable in total time of 105 man-hr and 21 truck-hr

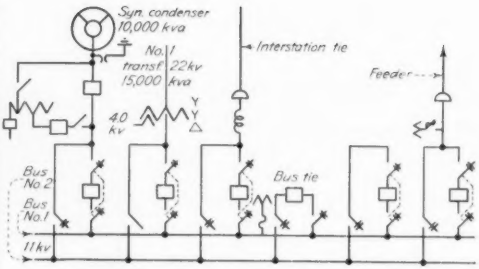
Pulling Rig Speeds Cable Removal

WAYNE A. PARKER
Chief Electrician
Oklahoma Gas and Electric Co, Oklahoma City

CABLE REPLACEMENT on a large scale prompted Oklahoma Gas and Electric Co to build the rig shown in its own shop. Steel pulling reel was obtained from the telephone company and reinforced. It is held on the truck by chains and boomers. Sprocket welded to the reel is chain-driven from a sprocket on the winch shaft.

Sheave hooked over rear of truck slides from side to side. A level wind is accomplished using a guy jack on each side. Sheave is made from 2 in. x 12 in. x 3 ft yellow pine. A 1¼-in. cold rolled shaft is mounted in ball bearings and supported by a 6-in. channel-iron frame.

With this rig, the removal of 16 lengths (5,773 ft) of 3/C, 4/0 cable took a total of 105 man-hr and 21 truck-hr, including time for reeling the cable off the steel reel onto a wooden one.



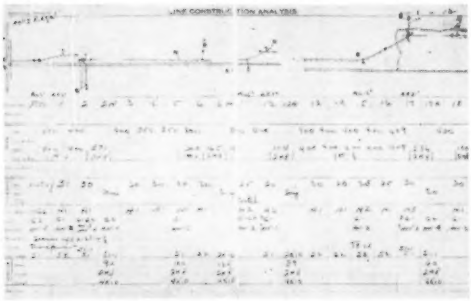
DISCONNECTS used in place of oil circuit breakers minimize costs without sacrificing flexibility of double bus arrangement

Auxiliary Disconnects Cut OCB Requirements

BY INSTALLING disconnects in place of breakers on auxiliary bus ties, an eastern utility minimized oil circuit breaker costs without sacrificing flexibility. As illustrated, only about half as many breakers are required. Two 11-kv buses are basic to the layout which includes a 10,000-kva synchronous condenser for power factor correction.

One breaker is provided in each circuit tying into the main operating bus (bus No. 1). Each breaker is protected by gang-operated disconnects on each side. Each circuit but one is tied to the auxiliary bus (bus No. 2) by closing a corresponding gang-operated disconnecting switch. Manual single-throw individual disconnecting blades tie the main transformer 11-kv secondary circuit to the auxiliary bus. The bus tie breaker is supplemented by a spare breaker to facilitate repairs on the main bus tie breaker without impairing flexibility. Like the feeders (one is shown), the synchronous condenser with its breakers can be connected to either bus.

Surveyor's Staking Sheet Used by Construction Contractor



W. L. RUSH
Louisiana Power & Light Co, New Orleans

SURVEYING PARTIES make up staking sheets in the field instead of using note books. Sheets are printed on onion skin type paper. The surveyor backs them up with pencil carbons and they are then blueprinted and used by the contractor for construction.

Symbols are somewhat similar to those used by REA. Company has used these sheets since 1944 and has built about 4,000 miles of line by them—very satisfactorily.

Black Light Locates Condenser Leaks

IN A NEW METHOD adopted by the Toledo Edison Co for testing condensers for water leaks, the steam side of the condenser is filled with water in the usual manner. Calcocide Uranine powder is mixed with water at a rate of 1 lb to every 10,000 gal of water used. This powder gives a fluorescent quality to the water. Black light such as can be obtained from a ZB-23 fixture is applied to the tube sheets and a vivid emerald ring or line will appear when a leak is present. This is a positive test for small leaks. In addition to saving much time in locating leaks, there is no lost time in drying tube sheets for the test. The test works best when tube sheets are wet. Testing can start when the water is rising in the condenser shell.

Light Truck Cuts Travel Time

BY ADAPTING a carry-all type of truck to replace larger trucks, which were used on the job, for transportation of field construction employees, an eastern utility cut a half-hour from each passenger trip. The smaller truck carries eight employees and reduces running time from 3½ to 2½ hr for a round trip—to the job in the morning and return in the afternoon. This is equivalent to a gain of 8 man-hr per day. In addition, operating costs were reduced by leaving the heavier trucks on location at the end of the day.

MANEUVERABILITY of truck permits proper pulling position. Coiler (arrow) and steel wire draw pulling-in rope through ducts

Reel Lifting Truck Simplifies Cable Installation

L. I. KOMIVES
Cable Div Supervisor, Underground Lines Dept
The Detroit Edison Co

MANUAL JACKING and handling of large cable reels are eliminated during field installation or removal of all types of cables by a cable reel lifting and turning truck. It was designed by The Detroit Edison Co in cooperation with The Hyster Co.

In operation the truck loads reels into a trailer at the reel yard and unloads them at the job. At the manhole, after drawing the pulling-in rope through the duct, the truck picks up a reel and maneuvers it into proper pulling position. During pulling-in the operator can match "pay-off" speed with pulling speed.

For removal of cable, the reel can be rotated at a speed which allows proper coiling of cable. When pull-out is completed, the truck can load the reel onto the reel trailer or even carry it back to the cable yard.

Six hundred pounds of steel per kw of generating station capacity is typical. Taking full advantage of the improved characteristics of rolled steel sections can save as much as $1 per kw by comparison with the designs based on strengths assumed a decade ago. Some of this comes from attributing more strength contribution to the better mixed and better placed concrete.

•

Substitute wall materials are available which cost about $1 per sq ft or $0.50 per kw less than common brick—the conventional wall material for power plants of an earlier era. These alternatives detract from the appeal of outdoor stations for those who anyhow are reluctant because of feared increase in operating and maintenance cost of outdoor plants.

Pipe-line cathodic protection is usually designed on a 10-year life for magnesium anodes and a 20-30 year life of zinc anodes. Installations cost less than 1% of the value of a gas distribution system.

•

High-frequency heating may prove to have economic merit in preparing pipes of pipe-type cable systems for application of bitumen protective coating as well as for oil pipe lines.

•

Substation savings have been achieved by using (1) aluminum in place of copper, (2) slab-type foundations on shallow stone fill, (3) rolled steel members in place of latticed ones, (4) insulated steel in place of masonry for housing switchboards, control batteries, etc.

Fused contactors in a group of station auxiliary circuits fed through a conventional circuit breaker save money for an Eastern power company because they find that these devices cost less than a third as much as breakers. A further step is to omit even the fused contactors in conjunction with a group of motors always operated together.

•

Foundations to bed rock once were considered the only safe thing for power plants with piling as an alternative. Better knowledge of soil mechanics has led to adoption of even cheaper alternatives. The saving can be of the order of $1 per kw. In India they are building a power plant on a single raft which will ride the weak soil as if it were a marine raft.

MAIN STREET lighting, provided by incandescent or mercury fixtures mounted on turned wood poles painted aluminum, costs much less with no sacrifice in appearance

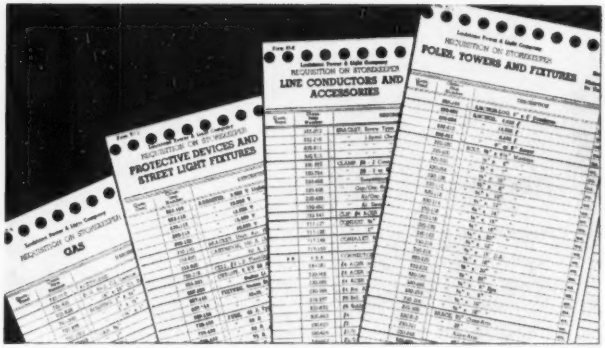
Turned Wood Poles Cut Street Lighting Costs

R. A. HOGG
Sales Engineer, Idaho Power Co, Boise

TURNED WOOD POLES painted with aluminum are bringing good ornamental street lighting within the reach of small towns served by Idaho Power Co. In addition, savings to the company amount to nearly $100 per fixture, compared with metal standards.

Standard cedar poles are furnished turned down for an additional charge of about $3.00 each.

An installation in Vale, Ore., offers a cost comparison between turned wood poles with overhead wiring and conventional standards with underground wiring. To light the main street would have required 12 conventional standards with an anaual ratio of investment to revenue of 7.58/1. Eight new refractor pendant type units on turned wood poles with overhead wiring brought the ratio down to 2.49/1. Monthly power bill for the community was about 20% less.



Preprinted "Requisition on Storekeeper" Sheets Save Time

W. L. RUSH
Louisiana Power & Light Co, New Orleans, La.

BY USING preprinted "Requisition on Storekeeper" sheets, much time is saved preparing a requisition. In addition, by using peg boards, much labor is saved in the Stores Accounting Office totaling up all requisitions.

One sheet each covers Poles, Towers and Fixtures; Line Conductors and Accessories; Protective Devices and Street Light Fixtures; and Gas. Items classified as units of property, as set up by the FPC, appear in bold type.

Similar preprinted requisitions are also used for material returned to stores. They are printed in red, instead of black, to differentiate them from requests for material.

After these sheets were in use for six months, it was seldom necessary to write in additional items.

Postal Card Billing Reduces Cost

ANNUAL SAVINGS estimated at $36,000 have resulted from the adoption of postal card billing by The Montana Power Co. This utility serves about 150,000 customers (electric, gas, water and steam) and issues about 120,000 bills monthly, all through a central billing office on IBM equipment. Savings are due to factors which include reduced postage, decrease in stationery, and improvements in accounting procedures.

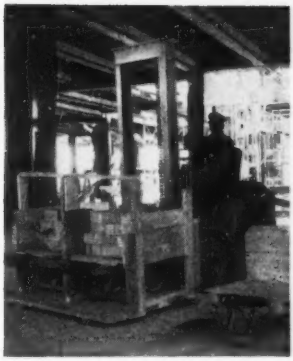
This method of billing was adopted a year ago and has been satisfactory in every way. Customer acceptance of this method has also been most favorable.

System expansion costs 1939-1949 took only one-fourth as much as if the outlay had been proportional to the growth in demand and output. A similar technical miracle needs to be done in the immediate part of the coming decade.

•

Considerable maintenance outlay can be avoided by use of totally enclosed motors for power plant auxiliary drives exposed to hazards. In one instance, slag leaked from the boiler and completely covered several of them but only the paint was damaged—no other harm.

Fork-Lift Truck Reduces Crew



DURING plant construction this truck was used by Toledo Edison Co for handling building materials. In place of pallets, a special wooden frame was built on the truck to accommodate two wheelbarrows for placement on the construction elevator. The method reduced the number of men needed from five to three. Equipment has also been found very useful for general moving of equipment and parts.

Adding Sulfite to Boilers Decreases Deposits in Turbine

TURBINE BLADE deposits, occasioned by increased carryover from boilers operating at higher temperatures and pressures, are greatly reduced by feeding sulfite to boilers for scavenging oxygen. While the reaction is not clearly understood, it has caused a considerable decrease in deposits of soluble salts on blades, as well as a decrease in boiler corrosion.

Elimination of outages for washing and maintenance of turbines has resulted in appreciable savings. This was reported by Oklahoma Gas and Electric Co.

Small Coils Save Re-reeling Expense

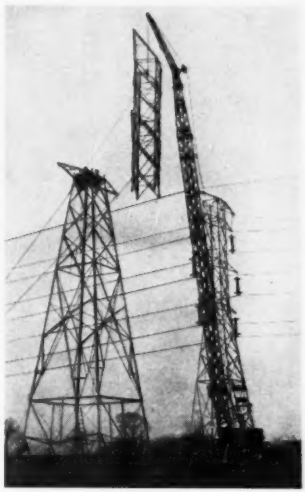
CLEVELAND Electric Illuminating Co now buys No. 6 and 8 weatherproof wire in 500 to 600-ft coils, weighing about 30 to 40 lb, which can be used directly in the field without re-reeling. Formerly the wire was purchased in coils weighing about 175 lb each, which were too big to carry around. Re-reeling into smaller coils was necessary, and an added expense.

There is no sacrifice in the unit purchasing price of wire obtained in shorter lengths.

Reinforced concrete floors for power plants are reported to be about $0.80 per kw more expensive than formed metal decking with light concrete fill. On an area basis the saving is about $0.75 per square foot.

•

Circuit breakers are expensive but the prices have not risen anywhere near as much as other items. Breakers of today have relatively far more rupturing capacity than those of a decade or more ago.



Crane Speeds Tower Construction

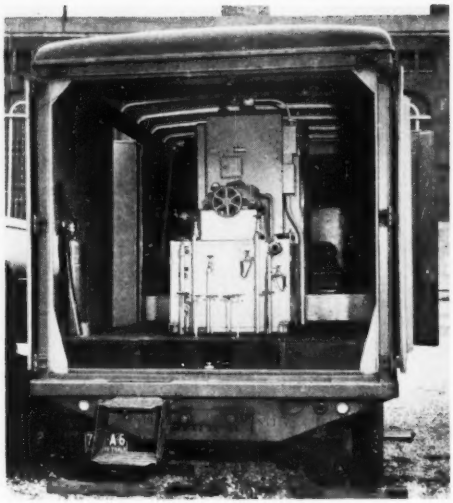
RUSSELL P. MILLER
Asst Supt, Overhead Lines
Indianapolis Power & Light Co
Indianapolis

SINCE the purchase of a heavy-duty crane, company crews have developed a tower construction technique that triples work and cuts cost. Towers are built in three sections. Sides of each section are assembled on the ground and then held upright by crane and laced together. Upper sections are lifted into position and bolted in place. Towers are 110 ft high; crane boom, with extensions, 115 ft high.

Under good conditions a crew can erect five to six towers a day using the crane, compared with two towers per day using a gin-pole.

Quick Acid Wash

CONSOLIDATED EDISON Co of New York Inc cleans its boilers with an acid wash in 24 hr. If the tubes were bored out on a three-shift basis, the job would take one to two weeks. The company uses a 3% inhibited hydrochloric acid wash which cleans bent and bifurcated tubes which could not be turbine-cleaned.



Hydrovolifier is A Great Time Saver

A PORTABLE hydrovolifier unit mounted on a large trailer, which can be taken by Toledo Edison Co crews to the installation, is equipped with a 1,200-gal/hr filter for carbon removal, a 500-gal/hr hydrovolifier, a 2,000-gal/hr pump, and a 500-gal storage tank. Pump is operated either by a gasoline engine mounted on the trailer or by an outside power source.

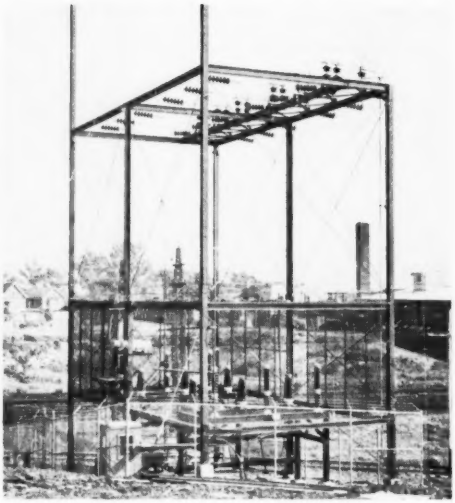
Equipment is used for routine maintenance in the field and for removing moisture from new oil before it is used. Reserve oil is kept in central storage tanks and taken to equipment in 2,100-gal tankers. The unit has been found to be adaptable to many unusual jobs.

Relieve Foremen of Material Supply Problems

H. P. COX
Electric Operating Superintendent
Indianapolis Power & Light Co, Indianapolis

TO RELIEVE crew foremen of the task of getting material to the job, a man has been assigned to maintain material supply to all gangs. Formerly, crew foremen spent much time providing the right quantity of the right thing at the right time and place.

Now, one man coordinates work between engineering department and construction crews, following jobs and having material on the job when it is needed. This practice has resulted in an increase in work completed.



Simplified Transmission Terminal Structure

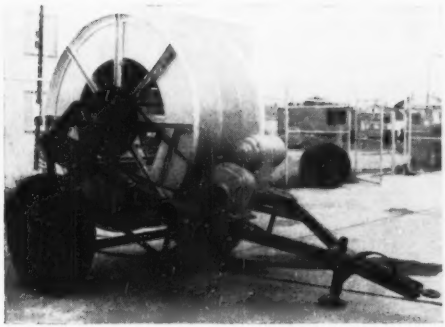
PROVIDING a simple installation in a limited space, six steel upright columns and several horizontal frame members, guyed by steel wire diagonals, form a terminal for an eastern utility's two-circuit, 4/0, 3-ph, 66-kv line as it leaves an oil-filled cable run. The small number of steel members required and the wide spacing achieved in this narrow area illustrate a most economical, as well as practical, design.

Steel Forms Reduce Cost Of Manhole Construction

REUSABLE steel forms, which were developed following adoption of standard manhole and vault designs, have decreased construction costs two ways on Oklahoma Gas and Electric Co's underground system. First, they eliminate use of less-durable form material; second, they reduce labor costs because unskilled labor can install and remove them.

In addition, these steel forms require two days less time for manhole construction and three days less time for construction of vaults.

Functions of the circuit breaker can often be performed advantageously in small substations by low-cost service restorers. To quote one confirming opinion—they "many times make all the difference in the world between good service and poor service, and do this at an economical cost."



Tri-Section Reel Holds Three Cables

L. C. RAMON, JR, Ass't Operating Engineer
Electric Distribution Dept, New Orleans Public Service Inc

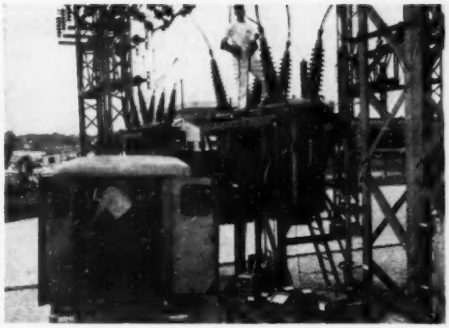
TO ELIMINATE three separate cable reels and attendant equipment when pulling-in three conductors in crowded business sections, New Orleans Public Service Inc has constructed a tri-section reel based on a design of Dallas Power and Light Co.

Steel plates were welded to the drum of a 78-in. reel, dividing it into three sections approximately 12 in. wide. Flanges on this reel give each section a depth of 15 in. Each section holds about 100 ft of 1½-in. cable.

Reel is supported by roller bearings on a permanently mounted axle and is driven by roller chain. A 3-hp, 1-ph, reversible, 115/230-v gearhead motor drives the reel at from 2 to 8 rpm. The motor can be removed easily when the gig is needed for other operations.

Weekday Switching Avoids Overtime

A DETAILED ANALYSIS of voltage conditions and load characteristics has been made by one utility, with the idea in mind of keeping overtime to a minimum by doing more switching on weekdays. Recently, such switching that had been reserved for Saturdays and Sundays has been attempted on weekdays with excellent results. In one case a complete substation was taken out of service on a weekday.



Testing Truck For OCB Maintenance

TO SPEED UP maintenance of oil circuit breakers, a truck has been equipped by Toledo Edison Co with all testing devices necessary for analyzing breakers. Power factor equipment for determining insulation characteristics, breaker analyzer, cathode-ray oscilloscope, and such meters as low resistance ohmmeters and voltmeters are permanently included in this mobile unit.

Sand Pump, Split Barrel Speed Pole Setting

L. M. ROBERTSON, Asst Supt, Hydro-Electric Production and Transmission, Public Service Co of Colorado, Denver

A SIMPLE sand pump operating inside a split barrel has cut by two-thirds the time required for crews of Public Service Co of Colorado to dig holes and set poles in wet sand.

In operation, the pump, which has a 12-in. plunger, is lowered inside the barrel. Two one-way valves (one on the plunger, the other on the bottom of the pump case) allow the wet sand to be drawn out when the plunger is moved up and down. The 2½-ft diam barrel, split vertically with hinges on both sides, sinks into the ground as the sand is removed.

After the pole is set, the barrel is pulled out and split for removal from around the pole by withdrawing one set of hinge pins.

There is always a chance to escape extra costs of duplicated spare parts and confused maintenance by buying repetitively—whatever the item, provided it has been kept abreast of requirements by its designers.

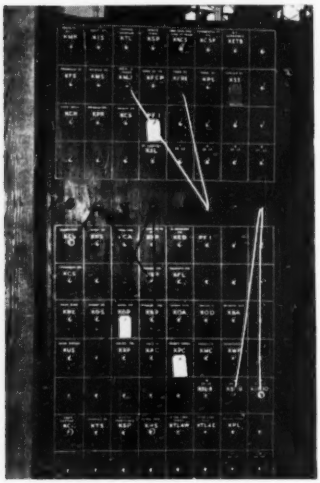
Three-phase transformers (backed up by a portable spare) are substantially less expensive than three single-phase units with the single-phase spare of previous practice. Simpler connections, too, save money.

Careful control of concrete mixes and better placement methods have resulted in savings of as much as one sack of cement for each yard of concrete. The reduction in power plant cost per kw is approximately $0.25.

Flexible Method of Showing Status Of Feeder Ties

N. W. THURSTON
Central Maine Power Co, Portland

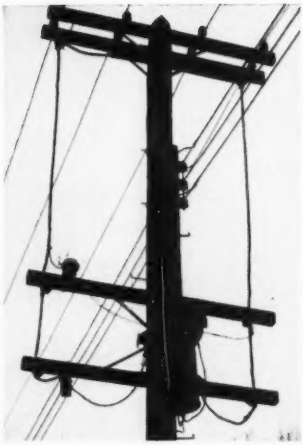
CENTRAL MAINE POWER CO employs a specially designed board which always shows the status of distribution circuit ties emanating from four substations. Formerly, circuit tie information was entered in the daily log and, when it became necessary to make or break the ties, dispatchers spent valuable time searching for it. Now, dispatchers indicate a new tie on the board by simply pulling out two ends of a cord and attaching them to the circuits involved. Dispatchers can easily tell which feeders are tied together.

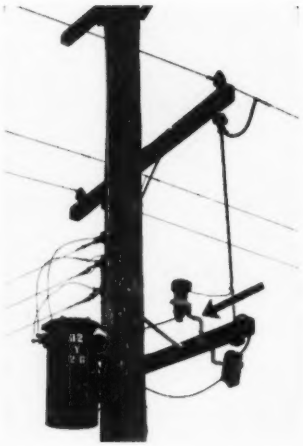


FLEXIBLE CORDS of different colors indicate at a glance all distribution circuit ties

The board is made of plywood (44 x 26 in.); weights and pulleys keep indicating cords taut and retract them when not in use.

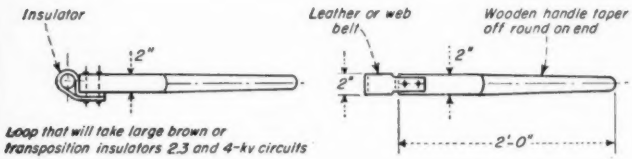
Upper section carries spaces each denoting a circuit feeding from the local substation. Lower section carries spaces for circuits feeding from three other substations. The board is arranged to allow any combination of circuit ties.





Bracket Eliminates Crossarm

COST of transformer installations has been reduced by Cincinnati Gas & Electric Co through elimination of one crossarm as illustrated (old design, left; new design, right). Saving is made possible through application of combination lightning arrester-cutout bracket (arrow above).



Loop that will take large brown or transposition insulators 2.3 and 4-kv circuits

Strap Wrench Gets Insulators Off Pins Quickly

CHESTER MOODY
Malden (Mass.) Electric Co

INSULATORS are removed more readily from pins on 2.3 and 4-kv circuits by the device illustrated. After the conductor is detached from the insulator, the loop of leather (or webbing) is dropped over the insulator top. Leverage available with the 2-ft handle greatly eases the turning required by linemen to separate insulator from pin.

Handle is varnished with two or three coats of glyptol for smoother work. Lines are worked alive, but dependence is on rubber gloves for insulation rather than on the wrench.

Tide range exposure to sea water raises hob with most paints but priming with 50-70% red lead in combination with zinc chromate, zinc oxide, iron oxide and magnesium silicate is reported to prolong the surface protection.

High-voltage test sets

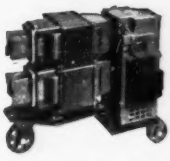
...THE WAY YOU WANT THEM

Portable?

These are popular units!

HIGH POTENTIAL. To 150,000 volts in stepless increments. Operates from 230 v.

HIGH CAPACITY. 300 kva, 30,000/60,000 volts is a widely used set.

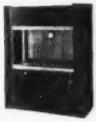


HIGH CURRENT. A typical rating is 4000 amperes, a-c. Operates from 115/230 v.

Stationary?

These are suitable for larger installations!

POWER SOURCE. A complete 20-kv, 2-kva tester, for general-purpose testing. Also available in other ratings.

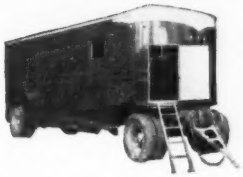


GLOVE-TESTING CABINET. Used with power source, for simultaneous testing of six rubber gloves at 20 kv.

HIGH POTENTIAL. Rated 350,000 volts, 1000 kva, this unit can be cascaded for even higher voltages.

Mobile?

Put a combination on wheels!



Almost any combination of equipments — for substation-to-customer testing, cable testing, high-frequency testing — can be mounted in this 8-wheel trailer — to make a complete, mobile testing set tailored to your needs.

3 BOOKS TO HELP YOU SELECT WHAT YOU NEED

These three 24-page bulletins will be invaluable to you in your work. Write for the ones you need — GEA-4477 on portable a-c sets, GEA-4559 on stationary a-c sets, or GEA-4595 on d-c sets. And for ANY special testing problem, tell us what you require. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

Third Wheel On Trailer Makes Handling Easier

PORTABLE transformer trailers, of the type illustrated at left, were developed by Cincinnati Gas & Electric Co to decrease the time and number of men required for coupling and uncoupling to trucks and maneuvering on the job. In addition, these "third-wheel-and-trailer-hitch" models can handle the increased weight of larger capacity transformers needed for growing loads encountered on the system at the present time.

Temporary Transfers Save Vacation Hiring

ONE BENEFIT of combined operations of gas and electric utilities is shown by the experience of Consolidated Edison Co of New York Inc. The need for personnel in gas production falls off considerably during the summer months when temperatures are high and gas sendouts are correspondingly low.

As this is also vacation time, Consolidated Edison has found that the transfer of gas production people to the electric production department for vacation relief purposes fits the needs of both departments and saves the hiring of new people.

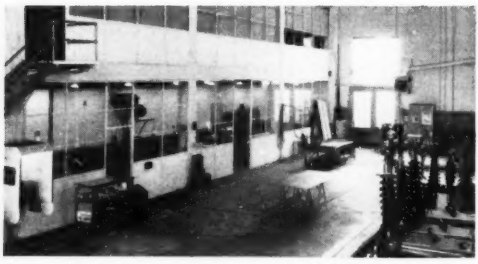
CRANE saves crew time and shortens line outage by suspending switch while pole is replaced. Outage time was cut by two-thirds

Crane Suspends Switch While Pole is Replaced

RUSSELL P. MILLER
Asst Supt, Overhead Lines
Indianapolis Power & Light Co, Indianapolis

SINCE its purchase, the crane shown has been in almost constant use, cutting costs by speeding up many types of construction and reducing length of interruptions.

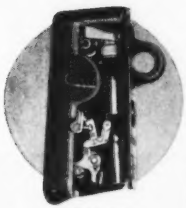
In a case where a car hit a pole carrying a 33-kv gang-operated, air-break switch, the crane suspended the switch while the old pole was replaced. It was necessary only to take out bolts holding switch to pole and re-install them on the new pole. Time required for the job was 3 hr compared to 8-10 hr the old way.



Shop for Repairing Substation Equipment

THIS centrally located shop has been equipped by Toledo Edison Co with a radial drill press, lathe, tilting-arbor bench saw, silver plating equipment and electric and acetylene welders. There is also a table-mounted saw for work on slate, transite and brick.

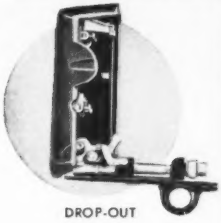
More Cost Cutting Methods on page 124



INDICATING

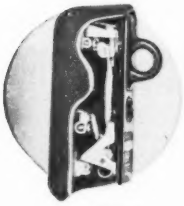
By Simply Changing Doors...

Four Cutouts in one!



DROP-OUT

RECLOSING



DISCONNECT

These General Electric enclosed fuse cutouts simplify your stocks. With *three interchangeable doors*, which fit both 5-kv and 7.5-kv housings, you get four operating functions—indicating, drop-out, two-element reclosing, and disconnect.

This is flexibility that spells real economy. By stocking only two housings and three doors, you can fill *all* your 50-ampere primary fuse-cutout requirements for circuits up to 12.5 kv Gr-Y—including a disconnect good for 100 amperes. The same flexibility is also available in 100-ampere cutouts, providing a 200-ampere disconnect.

When you need visual indication of a blown fuse, these are the cutouts to use. They are liberally designed—have permanently high dielectric strength, provide full-range interruption of fault currents and are conservatively rated as to interrupting capacity. All live parts are completely enclosed for maximum safety. For complete information, see your nearest G-E Representative, or write for Bulletin GEA-3448. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

406-30

Primary Fuse Cutouts for all Service Requirements

Non-indicating enclosed fuse cutout

Open-type cutout with drop-out fuse holder

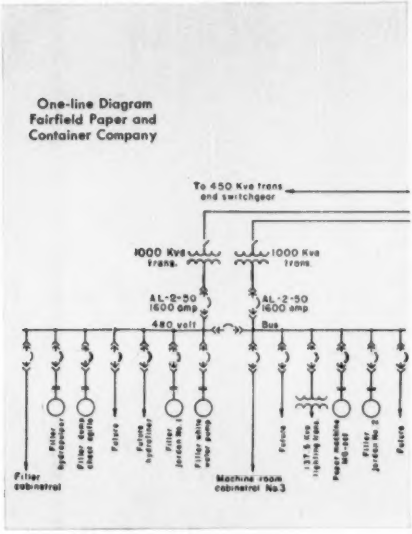
Flip-open fuse cutout for rural lines

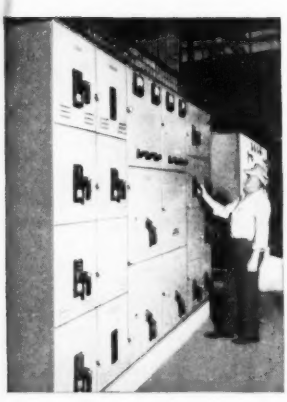
Oil fuse cutout for high interrupting capacity

FAIRFIELD
PAPER AND CONTAINER CO. chooses a

METAL-CLAD
for

General Electric 5-kv Type MI-6 metal-clad switchgear consisting of one incoming-line breaker and four feeder breakers to handle 4160 volts at Fairfield Paper and Container Co. Magne-blast air circuit breakers are rated 1200 amperes, 100,000 kva interrupting rating. Note neat appearance of metal-clad unit. It's space saving too, and the metal-clad construction offers operating safety to personnel. Units like this are easily installed and can be added to with a minimum of bother and expense. Instruments and relays are co-ordinated for positive protection of circuits.

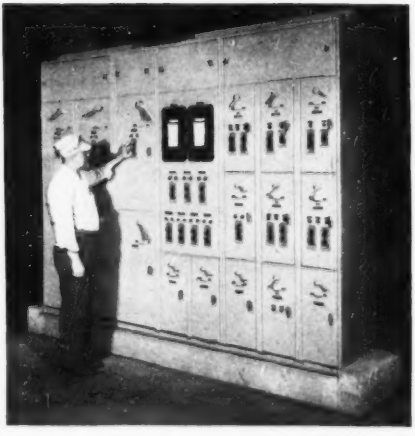




G-E Cabinetrol units provide centralized control for the liner stock system. Unit controls motors, valves, agitators, etc. Ammeters record load carried by hydrapulper and hydrofiner. Four other Cabinetrol units are used throughout the mill.

The Fairfield installation is a complete General Electric project—one source of responsibility plus the very best in co-ordinated planning, engineering, manufacturing, and servicing facilities to give maximum savings and efficiency to the customer.

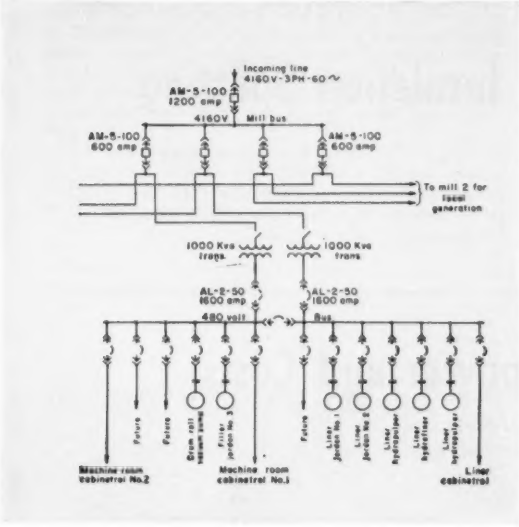
Two G-E low-voltage metal-enclosed switchgear equipments take the 480-volt power from the 1000-kva transformers and distribute it to motors, lighting transformers, and five Cabinetrol units. The Type AL-2 transformer secondary breakers and tie breakers are rated 1600 amperes, 50,000 amperes interrupting rating. Type AK-1 drawout air circuit breakers of 25,000 ampere interrupting rating are used to feed motors and Cabinetrol. Breakers for future circuits can be installed in spare compartments. G-E air circuit breakers have adequate "IC" (Interrupting Capacity) for short circuit protection, are easily removed for inspection.



secondary-selective system using

SWITCHGEAR

continuity of service



At the new Fairfield Paper and Container Co. installation General Electric metal-clad switchgear receives the incoming 4160-volt power and distributes it to 4-1000 kva transformers for step-down to 480 volts. G-E metal-enclosed switchgear handles the 480-volt power through air circuit breakers of the drawout type. In general, all motors rated 60 hp and above are served by an individual breaker. Five Cabinetrol units are fed by air circuit breakers. Note that costly secondary feeders are short.

This secondary-selective system is only slightly higher in cost than a simple radial system, and provides Fairfield insurance against a complete shutdown in case of failure of any one transformer or its primary feeder cable. If trouble occurs the normally-open tie breaker is closed, thus providing an alternate source of power which permits the mill to operate at slightly reduced capacity.

Be sure to see the "More Power to America" full-color sound slidefilm "Modern Industrial Power Distribution." Ask your G-E sales representative to arrange a showing for your organization.

here's why...

"When we planned our new facilities it was decided that a secondary-selective power distribution system would assure us of the continuous power, even in case of a major fault, needed for continuous-process operations like ours. We ordered G-E switchgear because their "metal-clad" protection safeguarded our employees, and because we could get all engineering, equipment and service from one organization. By dealing with one company we saved considerable time and money. The units arrived complete and we installed them in very little time."

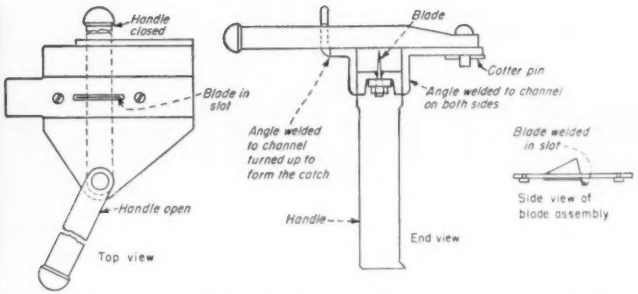
H. L. CUSTER, VICE PRESIDENT AND GENERAL MANAGER, THE FAIRFIELD PAPER AND CONTAINER CO., BALTIMORE, OHIO

MODERN INDUSTRIAL **power distribution systems using G-E switchgear are applicable to any industrial plant or commercial building where you want proper voltage for top performance of equipment, an extremely flexible setup to take care of expanding or changing loads, adequate short circuit protection, safety to personnel, and low installation and maintenance costs. A complete system, using G-E switchgear, costs you less than a "piece-meal," makeshift affair.**

INVESTIGATE TODAY **the many advantages of using General Electric switchgear in *your* plant for efficient, flexible power distribution. Contact your G-E sales representative for further information—or write for the helpful bulletins listed below. *Apparatus Department, General Electric Co., Schenectady 5, New York.***

GEA-3083	Metal-clad Switchgear
GEA-4966	Low-voltage Metal-enclosed Switchgear
GEA-3592	Load-center Unit Substations
GEA-3758	Load-center Power Distribution
GEA-4057	Interlocked-armor Cable for Primary Circuits
GEA-4352	Flamenol Cable for Secondary Circuits

GENERAL ELECTRIC



SPLITTER speeds up cutting insulation three or four times rate possible with hand knife. Blade assembly can be removed for resharpening

Special Unit Speeds Cable Insulation Splitting

NORMAN JAMES, Attleboro Steam & Electric Co

To speed up the splitting of street lighting cable insulation, the splitter shown was developed. With the unit clamped in a vise, it is only necessary to pull the cable through the device to split the insulation. When cable is on a pole, the splitter is simply pulled along the cable, cutting the insulation as it is moved along the line.

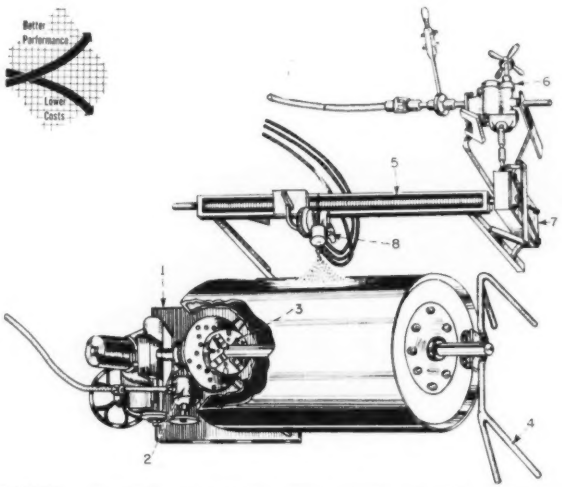
Metal Sprayer Saves Manpower and Costs

T. G. HAYES, Assistant to Maintenance Supervisor, Philo Plant, The Ohio Power Co, Philo, Ohio

By use of the shop-assembled apparatus illustrated, a reduction has been effected in metal-spraying costs. A job requires but one man and releases an essential lathe and an operator formerly required. In addition, the assembly presents practically no hazard since facilities are set up in a boiler room basement away from other equipment and in an area where other men are not required to work.

For rebuilding and reconditioning shafts, drums, pulleys, etc, by metallizing, the special assembly was made as follows:

A welding positioner (1), driven by an air-drill motor (2) was attached to a discarded lathe head (3) which clutches and rotates the work to be metallized while it is supported by the ball-bearing steady rest (4). Set on another stand, parallel to the work, is a discarded lathe traverse screw (5), driven by a reversible air-drill motor (6) through a discarded reduction gear (7) from a window-operating mechanism. The traverse screw carries the metallizing gun (8) with its oxy-acetylene hose connections back and forth the length of the work while the latter is rotated by the welding positioner.



SHOP-MADE equipment for metal-spraying utilizes supports and stands made from scrap

More Cost Cutting Methods on page 128

ECONOMICAL, ACCURATE MEASUREMENT OF SMALL DEMANDS

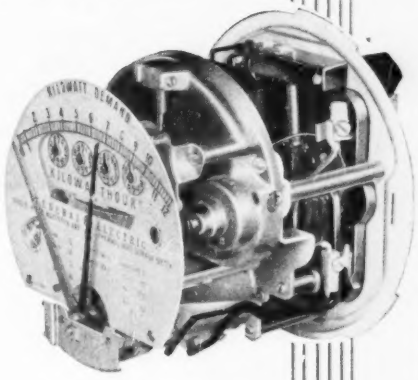
thermally..

G-E WATTHOUR THERMAL DEMAND METER, TYPE IHM

Reliability and lower maintenance costs are assured with this meter because the thermal element operates on the "direct-heat" principle. This produces a greater torque which permits the use of larger, sturdier parts. The direct-heat element also eliminates heat transfer. As a result, the meter will not overshoot on transient loads, response time can be easily predicted, and shorter testing time is possible.

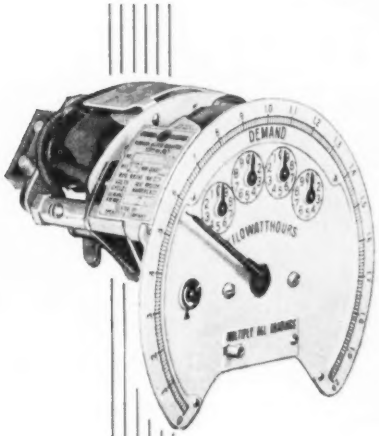
Sustained accuracy at high and low loads is assured by the wide-limit watthour-meter element. It also has braking magnets die-cast in the frame for added stability, and a relief gap that provides a controlled breakdown point.

This meter will save you installation costs because, though it is essentially two meters in one case, it fits standard watthour-meter installations. Complete details are available in Bulletin GEC-408.



mechanically..

G-E INDICATING DEMAND REGISTER, TYPE M-30



Your maintenance costs will be low with this register. A novel application of the Geneva mechanism resets the pointer-pusher by direct-drive gearing, thereby eliminating the need for the spring and latch mechanism found in conventional demand registers. Interval resetting is accomplished with precision and freedom from shock.

Liberal spacing of plates, shafts, and gears gives maximum visibility for inspection. Very substantial plates, plus parallel arrangement of shafts, insure perfect alignment of parts and stability of bearings with minimum adjustments. And, the fewer number of parts assures lower maintenance costs.

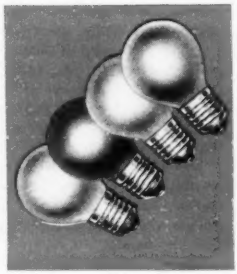
This register is available to replace the standard kilowatthour registers on a large variety of a-c watthour meters. Your nearest G-E representative will be glad to discuss your particular application, and fill your order. Call him today.

More details are available in Bulletin GEC-413. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

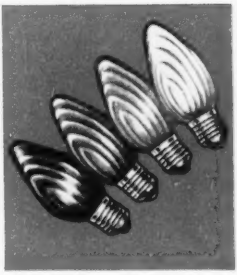
GENERAL ELECTRIC

This year it's Christmas lighting

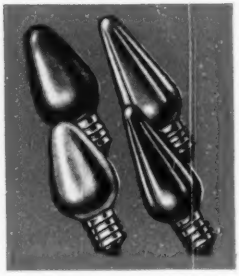
FOR FLOODLIGHTING—G-E PAR-38 projector lamps.



GENERAL ELECTRIC TYPE S-11, 10 watts, for outdoor decoration.



POPULAR TYPE C-9½ outdoor type Christmas tree lamps.



G-E CHRISTMAS TREE LAMPS—Series Type C-6, Multiple Type C-7½.

All these lamps to be promoted for

for indoors and out . . . another GREAT G-E PROMOTION that helps build lighting load!

THIS year we're selling Christmas lamps by the houseful—for complete home decoration, inside and out . . . all the different types you see below!

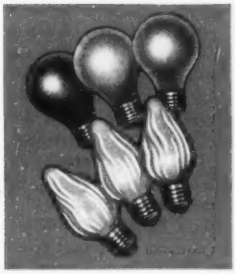
Everybody likes to dress up the house for Christmas and this year we're showing 'em how in a big way! Heading the promotion is a big, double-page full color advertisement in the November 26 Saturday Evening Post. It's filled with ideas on Christmas lighting that will make your customers want to buy lamps and Christmas lighting fixtures as they've never bought before.

To help retailers cash in, there's a special display package packed with colorful sales helps.

It's going to be the greatest Christmas lighting season ever—and that means bonus revenue for you in increased holiday lighting load! By adding your own promotional efforts to General Electric's, it can be bigger yet.

Above are window streamer, 2-page Post ad, 1-page Life ad, and two counter displays.

GENERAL ELECTRIC



STANDARD BASE DECORATIVE—Type A-19 and Type F (flame shape).

G-E HOUSEHOLD LAMPS in the new 4-lamp package—sells four lamps instead of one!

Merry Christmas
General Electric
Sun and Heat lamps
Perfect gifts for under the tree!
G-E Sunlamps give that glowing summertan look all year 'round. Only $8.50
G-E Heat Lamps soothe muscular aches and pains. Hard glass model with red filter $2.95

holiday lighting!

Mechanized Construction Permits Assembly of Equipment on Ground

CONSTRUCTION COSTS of Cincinnati Gas & Electric Co are cut by assembling equipment on ground and raising it with 10-ton truck crane. Practice results in speed-up of work and maximum use of groundmen. Also, it reduces the amount of heavy aerial work linemen must do. Additional work accomplished using crane is estimated to be equivalent to having another large line crew.

In one case, a metering station (illustrated) for a large customer was fully installed in an existing 66-kv line 24 hr after line was out of service. In another, an air-break switch was completely assembled on the ground and then raised by the crane.

Air Impact Wrenches Pare Overhaul Time

AIR IMPACT wrenches have taken the hard work out of loosening and tightening large turbine bolts on the Toledo Edison system. In addition to making the work safer they give an even tightening to the bolts. On a turbine overhaul, about four hours of time has been saved by using this wrench. The company uses a large size wrench to accommodate bolts on turbines and a smaller size for bolts on heater heads.

Burns Oil and Coal Together in Economy Move

WITH OIL PRICES going down and those of coal staying up, Cleveland Electric Illuminating Co is using considerable quantities of oil in its pulverized dual-fired boilers at one plant.

At present, the fuel combination used consists of about two-thirds oil and one-third coal. While pulverized coal is blown into the boiler, oil is pumped in on one side and live steam on the other.

Oil will comprise less than 4% of the company's fuel requirements but even this limited use will result in a very substantial saving.

Relays Defer OCB Replacement

SPECIAL RELAYS can be installed to defer replacement of older types of feeder oil circuit breakers in cases where duty exceeds interrupting capacity for fast reclosing only on close-in faults. This saving is the result of experience gained by Oklahoma Gas and Electric Co during their program of de-rating interrupting capacity in rapid reclosing of older types of feeder oil circuit breakers.

Special relays have been installed to recognize close-in faults and delay reclosure for 15 sec.

Savings are certainly to be derived from close supervision of planning—savings that are lost and realized only as an afterthought if the planning is poorly coordinated.

•

Letting transformer loading rise to about 40% excess of the rating before replacement has saved a power company 30% in incremental investment in transformers.

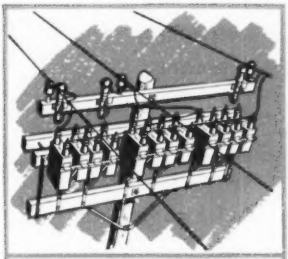
Improvement in transformer surge design and protection permits the savings that come from using one bracket lower voltage rating—66 kv for 88 kv systems, 115 kv for 132 kv, etc.

•

Hook-stick operated switches are, wherever possible, used by one company in lieu of gang-operated disconnects.

More Cost Cutting Methods on page 132

...for Topnotch Performance!



Capacitors provide the quickest and most economical means of relieving system overloads and improving voltage conditions where low power factor loads prevail. Capacitors may be obtained from stock, and installed costs are low...less than $10 per Kvar.

Moloney Capacitors are built to the highest standards of quality to assure the excellence of performance that is expected of any product bearing the name Moloney. Reliability of performance is insured by high factor of safety in design, expert workmanship, careful processing and thorough testing.

Individual capacitor sections are wound of aluminum foil and pure kraft insulating papers. Winding is done under controlled temperature and humidity conditions to assure uniformly wound, wrinkle-free sections.

Sections are individually tested prior to assembly into complete capacitor packs. Multi-layer major insulation is placed in the case, and then the assembled pack is inserted. Sections are then connected in parallel groups and groups are connected in series, with a discharge resistor across each group. The cover, with the bushings already installed, is then welded into place completing the case.

The capacitor is now ready for drying and filling with Askarel. Moisture and air are removed by thermo-vacuum treatment, following which non-inflammable Askarel is used to impregnate the capacitor pack and to completely fill the case. Next the filler openings are sealed off and the capacitor is pressure tested for leaks. The capacitor is then given its final electrical tests and packed for shipment.

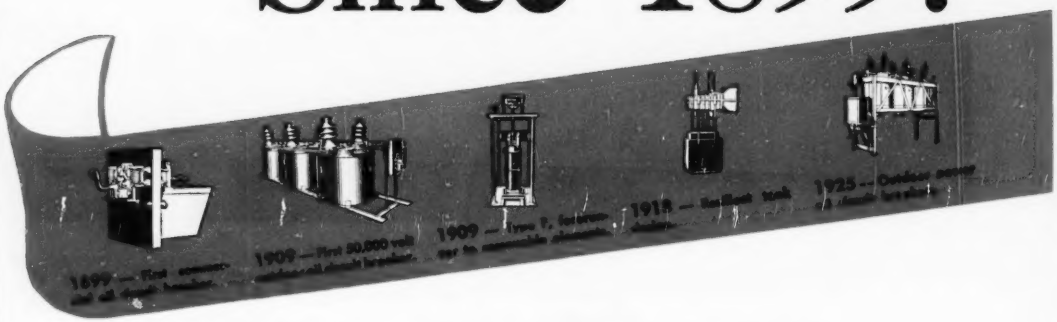
ME49-9

MOLONEY ELECTRIC COMPANY

Sales offices in all principal cities

FACTORIES AT ST. LOUIS 20, MO., AND TORONTO, ONTARIO, CANADA

Building Power Circuit Since 1899!



New ASA Ratings up to 230 kv, 7,500,000 kva Typify Allis-Chalmers 50-year Progress Toward Increased Interrupting Capacities, Higher Operating Speeds, Lower Cost Maintenance.

FIFTY YEARS OF PROGRESS in any industry is an accomplishment. In power circuit breakers it represents the *entire history*. For in 1899 the first commercial oil circuit breaker for Central Stations was built, in what is now Allis-Chalmers Boston Works.

Since then many milestones of design progress have been covered. Today, Allis-Chalmers offers you a complete line of both indoor and outdoor breakers, designed and built to meet *today's* exacting standards.

Whatever your particular power circuit breaker requirements, an Allis-Chalmers sales representative will be glad to call and discuss them with you. District Offices located in all principal cities.

A-2846

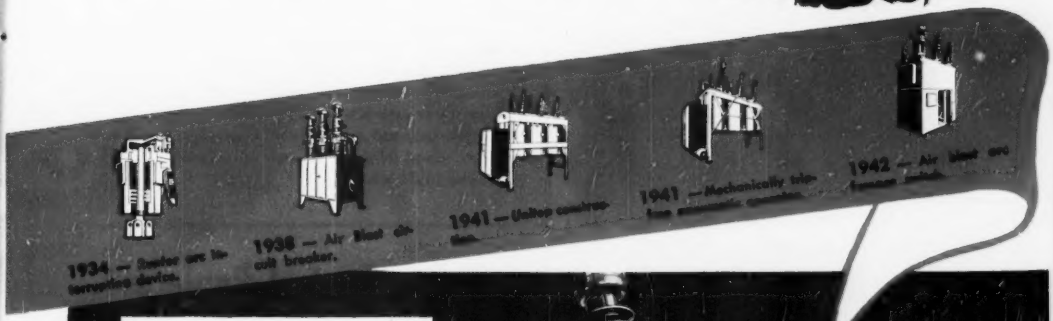
ALLIS-CHALMERS, 932A SO. 70 ST.
MILWAUKEE, WIS.

Ruptor and *Unitop* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

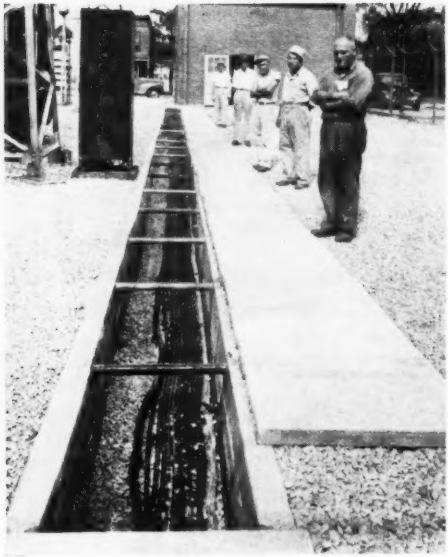
Pioneers in Power and Electrical Equipment from Generation through Utilization

Fine Breakers


1934 — Duster arc interrupting device.
1938 — Air blast circuit breaker.
1941 — Unitrol control.
1941 — Mechanically trip-free automatic operation.
1942 — Air blast arc

1947 1948 1949

Supervoltage power circuit breakers with 3 or 5 cycle interruption, 161 and 230 kv, interrupting capacities up to 7,500,000 kva.



Savings Made by Bi-Monthly Meter Reading and Billing

In 1943 Consolidated Edison Co of New York adopted bi-monthly meter reading and billing schedules for all of its meters with the exception of demand installations. Estimated annual savings in labor at the time were indicated as $2,095,000.

Average salary of employees involved has increased 69% so that savings today are considerably in excess of the lower estimate of $1,989,000 a year, which also took into account an increase in uncollectible bills. At present about 97% of the company's meters are read on bi-monthly schedule.

Concrete Trenches Provide Accessibility

Concrete trenches for control cables are used in Toledo Edison Co substations to provide easy accessibility to control cables. Concrete slabs fit across the top and serve as covers. It has been found that cable lasts longer in these trenches than in metal conduit.

Voltage Control Replaces Regulating Equipment

To save costs of providing supplementary regulating equipment in their transmission system, Oklahoma Gas & Electric Co is cooperating with interconnected companies by varying voltage at the generator. Extent of variation is about 5% between heavy and light loads.

Reduce Costs by Laying Fiber Duct for Control Cables in Concrete Sidewalks

H. L. DELONEY, Special Engineer
Louisiana Power & Light Co, New Orleans

Banks of 3-in. fiber duct conduit, for multi-conductor control cables in 110-kv substations, effect two major savings when laid in concrete sidewalks. First, considerable money is saved by the substitution of cable having polyvinyl chloride insulation and a polyvinyl jacket for cable with leaded sheaths inside metal conduits or armored parkway cable. Second, installation labor is materially reduced because excavation, pipe fittings and cable pulling is minimized.

Conduit is laid directly in sidewalks built for accessibility to equipment. Shallow manholes, convenient to equipment, are located in the sidewalks. Cable is pulled through conduit and then carried from a manhole to equipment through metallic conduit. In some cases, cable is buried directly in the ground, with metallic conduit only from equipment control cabinets to 90-deg L's under the ground, thus minimizing use of metallic conduit.

Portable substations can be used to meet a wide variety of emergencies in addition to scheduled maintenance operations. The permanent substation can be by-passed for repairs or upkeep without any overtime costs. Even simple portable transformers will achieve proportionate savings.

More Cost Cutting Methods on page 137

HI-TENSION NEWS Junior

For the 3rd Time..OB is the CHOICE OF INSULATORS

● Ohio Public Service Company is now completing its Third Burger Circuit, connecting the large, modern Burger Steam Plant below Wheeling, West Virginia, to various parts of its system serving portions of northern and central Ohio. As output of this plant has grown within the past four years, new connections have been established, necessitating at present three 132-kv circuits totaling approximately 275 miles.

As one after the other of these circuits has been built, O-B suspension insulators and hardware have been used throughout. The latest circuit is on Cooline non-magnetic hardware, the most recent refinement in transmission practice.

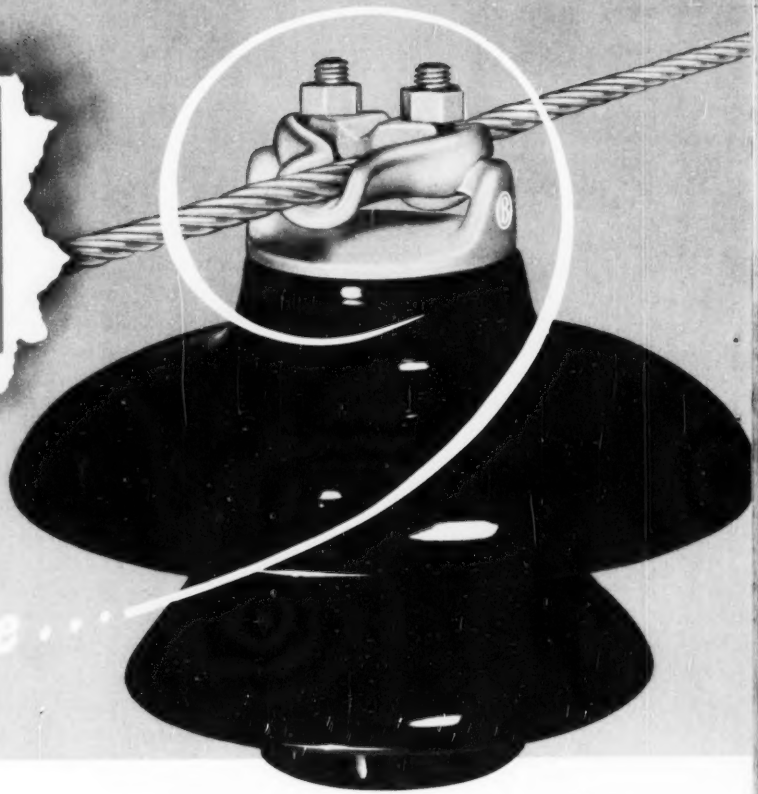
Ohio Brass

MANSFIELD, OHIO, U. S. A.

● Installing O-B Cooline hardware and suspension insulators on the Third Burger Circuit of Ohio Public Service Company.

● For a distance of about 35 miles, all three circuits occupy the same right-of-way as they leave the new Burger Plant. The first two lines, built in 1945 and 1947, were constructed of wood because of wartime restrictions, which is a departure from the company's steel structure practice, as indicated by the latest line. In the four years' combined operation of the first two lines, lightning outages have averaged less than one per hundred circuit-miles, per year, in rough, hilly territory of the 50-storm-day class.

HI-TENSION NEWS
Junior



Better than a Tie Wire . . .

. . . and cheaper from every standpoint

A skilled man can lash together a surprisingly good joint—if he *has* to—but a simple bolt will do it better, quicker, and more permanently.

We have "lashed" conductors to pintype insulators with a tie wire for many years, and also gotten a good job, but that doesn't mean it can't be done better.

O-B Clamptops eliminate this tie connection. A simple bolted jaw does away with the cost of the tie and most of the installation time. Because the clamp provides a permanently tight connection with the conductor, and the metal base of the clamp terminates within the porcelain body, electrical spitting is relieved and the electrostatic field of the insulator is modified beneficially, thus producing one of the most radio-quiet pintype insulators ever made.

Bolts, in place of a loose tie wire, make hot line changes safer and surprisingly easy, with conductor attachment fully as strong as a "cold" installation.

Slip strength of the Clamptop is from 2,000 to 2,500 pounds, depending upon the size of the insulator. This is materially higher than the best-made cold tie, and possibly double that of a hot tie.

Installed on the line, O-B Clamptop insulators are moneysavers; they are safer and better to handle hot; they keep down radio interference complaints—and they're thoroughbred O-B pintypes for satisfaction and durability.

IT ISN'T ENOUGH JUST TO *START RIGHT*

O-B STATION INSULATORS *STAY RIGHT!*

When you build your new substations according to modern Basic Impulse Insulation Levels (BIL), here is a line of station insulators that has been designed to fit BIL requirements.

But, being right to start with is only a small part of the story. Compliance with recommended protective levels and established manufacturing standards is a condition required only in a *new* insulator. How long this condition endures—how long the insulator will survive against exposure, thermal strain, mechanical shock, and electrical stress—is still a function of manufacture and still a variable element.

In evaluating one insulator against another, the question is not how well it meets industry standards—all do that. The real question is how long a certain insulator will *retain* its original characteristics.

Of the millions of O-B station insulators in service, most have been bought on repeat orders; many on the experience of some 35 years of service. Users have called upon their own records for facts, and these facts show an overwhelming preference for "more of the same"—O-B. Cash in on this experience in making your own insulator selection.

Ohio Brass

MANSFIELD, OHIO, U. S. A.

CAN YOU HANDLE A FURTHER 300% INCREASE IN RESIDENTIAL POWER CONSUMPTION?

Here are some plain, simple facts relating to primary distribution that merit serious consideration

In the past ten years, residential power consumption has increased 82 per cent, according to official figures.

●

Well-informed men in the Electrical Industry talk in terms of an additional 300 per cent increase by 1960.

●

The average city primary distribution system is inadequate for such future conditions—if not now overloaded.

●

The answer to meeting this demand is higher primary voltage. Many systems have taken this step. Others are faced with it. Most others contemplate it.

Present overhead lines often can be utilized at higher voltage with little or no revision except for one thing—deadends. Low voltage practices must be revised at these points for acceptable operation and safety.

●

Experience has proved that the six-inch suspension insulator unit offers the most favorable combination of first cost, installation expense, and electrical and mechanical qualities. This unit has become virtually standard in higher voltage primary construction.

●

Since you will need these deadends eventually, as a part of a higher voltage primary system, you can save the expense of duplication of material and labor by building *all* primary deadends, *now*, with six-inch suspension units — get improved safety factors while operating at low voltage—be ready for the increase without the cost and hazard of rebuilding in the area of crowded pole tops.

●

With complete frankness and honesty, we advocate consideration of the above facts as a sound, foresighted economic measure.

. . . and when you build your deadends

All of the traditional durability of O-B suspension insulators is found in the O-B six-inch, rated at 10,000 pounds M&E strength, 60-kv dry and 30-kv wet flashover. This unit, in large numbers, has been applied to high voltage primary construction in many localities for the past 15 years with an outstanding service record. Be sure your construction standards include this unit by its catalog number—32433.

Ohio Brass

MANSFIELD, OHIO, U. S. A.

Distributed by GraybaR Electric Company

2980-M

Chain and Lever Replace Wale Pieces

CARL GREEN
Connecticut Light & Power Co, Waterbury

ELIMINATING wale pieces formerly used in making forms for concrete, Connecticut Light & Power Co now ties forms in place by chain and lever as illustrated. Savings are realized because: (1) Wale pieces and nails are not required; (2) excavations up to 6 in. narrower can be used; and (3) form setting is fast and simple.

Preservative treatment of poles may add a few percent to the initial cost but the life is prolonged 75 to 100% in the experience of one Eastern utility. The gain is better assured if the poles and the treatment are strictly specified and verified.

•

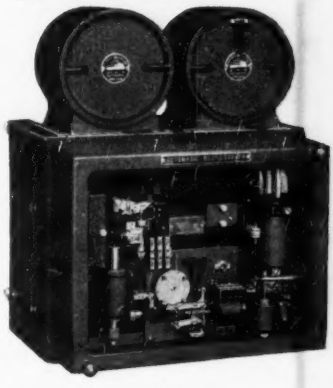
Sub-contractors who have to take a gamble on adverse conditions naturally will put a contingent item in the bid for protection. The utility usually saves money over-all if it takes the composite gamble.

•

Transformer burnouts are capable of a 40% reduction (in one instance over a six-year period) by adopting modern effective lightning protection.

Lightning-Fast Records..

..with this G-E Automatic Oscillograph type PM-13



In one quarter cycle this automatic instrument goes into action. It provides you with detailed, graphic records of how your power system behaves under all fault conditions. This information can help you—

1. Reduce loss of service. Faults are more quickly located for repair
2. Save money on special patrol expense
3. Detect minor faults before they cause major damage
4. Determine causes of system instability
5. Supervise relay and breaker operation.

THE PM-13 IS FULLY AUTOMATIC. No operator is needed. It starts (in 1/240 second), records entire disturbance, and stops after fault has been cleared. Operation can be initiated by any device that will break a circuit, so it is suitable for use at an unattended station. It will make 100 oscillograms without attention.

CLEAR, WELL-SPACED RECORD. A special arrangement prevents crowding at the start, and the lamp burns more brightly at that time to assure a clear starting record. The trace paper is 4¼ inches wide. This permits ample separation of traces yet avoids the high cost of wider paper.

DEPENDABLE OPERATION. This oscillograph operates from its own power source (automatically kept at full voltage). During the standby period the only part energized is the light source—no moving parts to wear out or require attention. No special skills are required to care for it.

MORE ADVANTAGES—Built-in alarm contacts, adjustable recording time (two to twenty seconds), and time-stamp identification (date, hour, and minute of record) are just some of the other reasons why you'll appreciate every PM-13 in your system. You can order now from your nearest G-E representative. Or, if you want more information, write for Bulletin GEC-396. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

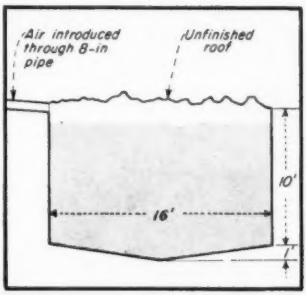
GENERAL ELECTRIC

BERMICO* FIBRE CONDUIT

BERMICO CONDUIT IS REALLY RUGGED—IT'S BUILT TO TAKE ROUGH HANDLING ON THE JOB.
ITS CLEAN, SMOOTH BORE MAKES PULLING CABLES THROUGH BERMICO FIBRE CONDUIT QUICK AND EASY.

distributed by
WESTINGHOUSE ELECTRIC SUPPLY COMPANY
Offices in all leading cities

BERMICO FIBRE CONDUIT—A PRODUCT OF BROWN COMPANY



Tunnel Capacity Increased 25%

H. A. BURT, Asst Supt
Hydro-Electric Production and Transmission
Public Service Co of Colorado, Denver

WATER-CARRYING capacity of a tunnel with an unfinished roof can be increased by supplying air under pressure between roof and water surface. Public Service Co of Colorado increased output of the Shoshone plant from 14,000 to 15,500 kw by forcing air into the tunnel as shown. Two positive pressure blowers introduce air at the second of nine adits in the 12,200-ft tunnel.

Elimination of friction and turbulence due to projecting rocks of the roof has cut losses in the tunnel 25% and increased plant output 10%.

System impedance is typically divided 50% up to the distribution transformer and 50% from the transformer primary terminals on. Increase in transformer rating (assuming reduction in reactance impracticable) can be a better answer to voltage flicker and dips than larger wire, particularly in areas of light load density.

•

Capital outlay for new facilities of non-productive nature can often be deferred if analysis so indicates. That is particularly true of utilities with outlying district offices and operating centers. Continued outlay for maintenance of existing facilities may prove preferable.

•

Sheet metal troughs for control and auxiliary cables make the power plant over $0.50 per kw cheaper than the individual conduits of prior practice.

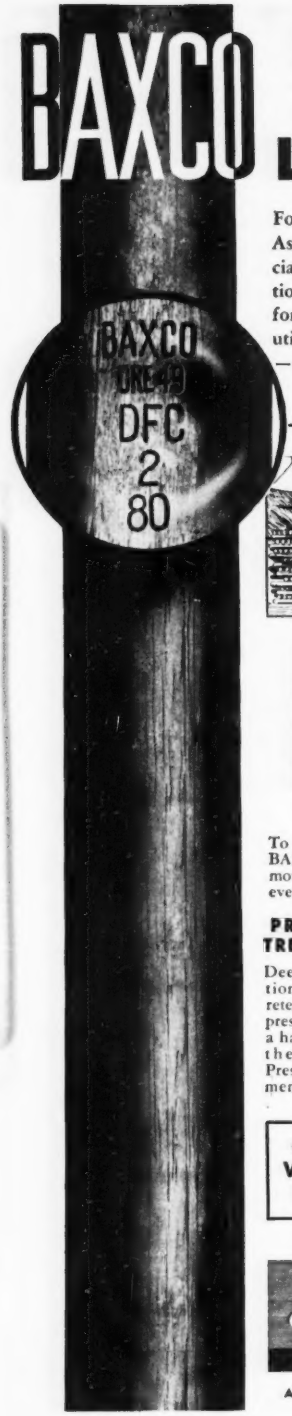
Keyed to this ELECTRIC ERA

Electricity certainly makes the difference on the Remington Electric DeLuxe —makes this typewriter operate with greater ease, greater speed, greater accuracy.

The all-purpose Electric DeLuxe *saves time, saves work, saves money.* Its fast, easy electric action allows fingers to fly over the keyboard—turn out *more work, better work* in *less time.* As a result, scientific studies reveal that an increase of 10% or more in typing productivity can result from *each typing station* in an office equipped with the Electric DeLuxe.

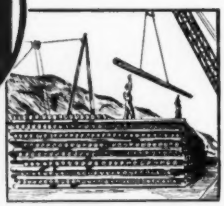
● Why not send for a FREE copy of the color brochure, *"New Office Profits Through Electricity."* It will show *you* how to start saving today—by decreasing office costs and increasing typing production—the *electric way.* Address your requests to: Business Machines and Supplies Division, Dept. T-11, Remington Rand Inc., 315 Fourth Avenue, New York 10.

Remington Rand THE FIRST NAME IN ELECTRIC TYPEWRITERS



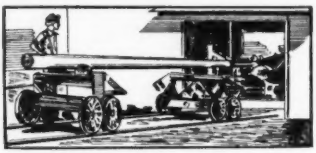
LONG-LIFE DOUGLAS FIR PRESSURE TREATED LONG POLES

For over 50 years J. H. Baxter & Co. with its Associated Pacific Coast Companies has specialized in the production and sale of exceptionally long (up to 125 feet) Wood Poles for the electric power, lighting and telephone utilities . . . Stocks in all lengths are complete — shipments prompt!



PROPER SEASONING

BAXCO poles are carefully seasoned in dry, clean yards. Proper pre-conditioning before Pressure Treatment adds years of longer life.

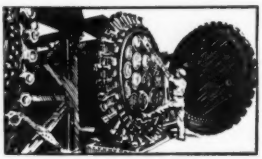


MACHINE SHAVING

To produce smoother and more uniform poles, the BAXCO process includes machine shaving. This removes small swells and results in a more round, evenly tapered product.

PRESSURE TREATMENT

Deep penetration and high retention of the preservative is a hallmark of the BAXCO Pressure Treatment Method.

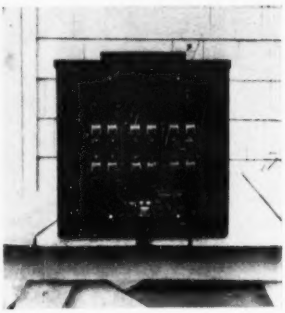


Get the Full Story! Write today for this BAXCO BOOKLET

J. H. Baxter & Co.

333 MONTGOMERY STREET · SAN FRANCISCO 4, CALIFORNIA

ASSOCIATED COMPANY: J. H. BAXTER & CO. OF OREGON



Outdoor Meter Box Halves Cost

J. E. BURNEY
Supervisor of Meters
Alabama Power Co
Birmingham

DESIGNED and developed to replace a large enclosure costing about twice as much, this waterproof polyphase meter box accommodates a combination watthour demand meter, either thermal or block interval, for out-of-doors metering of commercial loads. In addition the box presents a much neater appearance. It also is about half as expensive as the duplex meter trough required by socket type watthour meters and thermal demand meters on similar installations.

Service-drop cable costs could be pared as much as 20% to 30% by using aluminum instead of copper as long as the price for copper was correspondingly adverse. Gains from a similar substitution in the case of open-wire services measured 16% to 25% in the case of an Eastern utility.

•

Half the cost of circuit capacity has been saved by one utility that uses step regulators (eight 1¼% steps) instead of four-step units. Regulator outlay is 22.5% less than for induction or 32-step units but only 10% more than for four-step.

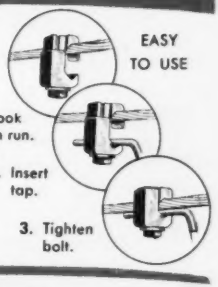
•

Careful and insistent supervision of delivery of materials for new construction can eliminate $2 per kw of overhead to cover the cost of the delays commonly experienced.

Get to Know These Time Savers
from FARGO'S LINE HARDWARE SERIES

"ONE-PIECE" VISE-TYPE CONNECTORS (5000 Series)

The Fargo "One-Piece" Vise-Type Connector employs the principles of a common vise. It is strong, vibration proof and extremely easy to apply. Simply loosen the bolt, hook on the run, insert the tap and tighten. It is "one-piece" . . . no threading problems . . . made of corrosion resisting bronze . . . reusable . . . a solid mechanical as well as electrical connection. The standard 5000 Series is available in all sizes from No. 8 solid copper to 100MCM copper, inclusive.



"Built like a vise — Grips like a vise"

AUTOMATIC LINE SPLICES (LS Series)

The Fargo Automatic Line Splice is an easy-to-use, durable and time-saving method of making wire splices for emergency repairs or new construction. It is better electrically than an equal length of conductor and will hold under tension to the ultimate strength of the wire or cable. Once subjected to line tension the "one-piece" gripping cones set up firmly, but they can be released readily for salvage. Standard sizes range from No. 8 solid copper to 500MCM copper.

INSULATED LINE SPLICES (SFO, SFS, SFT Series)

The Fargo Insulated Line Splice is automatic in operation and is used where an electrical break in a continuous run of wire is needed. Examples are series street lighting, secondaries back-to-back and primary fusing cutouts. In many applications it eliminates unnecessary dead ending of conductors at a considerable saving. Available in sizes from No. 8 to 2/0 strand and 3/0 solid.

BAIL TYPE AUTOMATIC DEAD ENDS (CL69 Series)

The Fargo CL-69 Series Dead End has the same wire gripping unit as used in the automatic line splice, except that the conductor will pass completely through for connection to other equipment. The construction is such as to allow the removal of the Copperweld bail by unscrewing one screw and thus permitting it to hinge to one side. The hinging of the bail gives plenty of room for it to be threaded through the hole of an insulator, secondary rack, etc. The outstanding feature of this Dead End is that it is entirely one assembly with no parts to lose. It is strong, light and inexpensive. Available in sizes from No. 8 sol. to 250MCM.

SPRING LOADED HOT LINE CLAMPS (AGE Series)

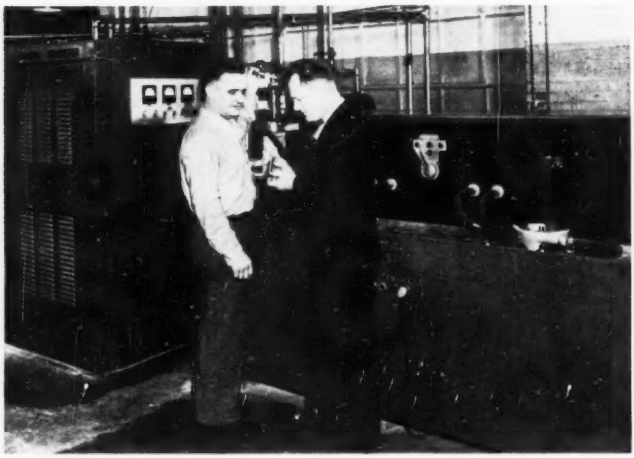
The Fargo Spring Loaded Hot Line Clamp is equipped with a heavy duty Vanadium steel spring of square cross-sectional stock. It is this spring that makes up for the variables caused by fault currents . . . atmospheric changes . . . load variations—and the tendency of the conductor to "relax" or "flow" while under stress. Also, it is this spring that compensates for the different torque linemen use in tightening connections. It is vibration proof and is easily, quickly and safely installed at the end of a hot line stick. 3 sizes cover the range from #8 to 750MCM.

FARGO

Manufactured by
FARGO MFG. COMPANY, INC.
Poughkeepsie, N. Y.
Distributed by
LINE MATERIAL COMPANY

LOAD BUILDING

Induction Heating Ups Sprocket Hardening Production 50%



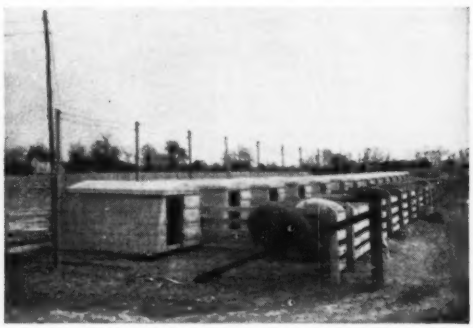
ELECTRONIC GENERATOR (left) supplies power for induction heating of wheel sprockets and other parts, resulting in greater uniformity, fewer rejects, and decreased handling

PRODUCTION of 55-tooth wheel sprockets was increased 50% by use of induction heating at Harley-Davidson Motor Co, Milwaukee, Wis.

A total of 650 rear wheel sprockets can be hardened per day as compared to 440 per day by the old method. Formerly, the 55-tooth sprocket was heated in its entirety. Now selective hardening of the teeth by the electronic method leaves the remainder of the work unaffected by heat, reducing the possibility of distortion.

The Induction Heating Corp installation consists of an induction generator and a two-position work table with special jigs and fixtures for automatic operation. Induction equipment can be applied to numerous jobs, such as selective hardening of idler gears, cam gears, crank pins, gear shafts and clutch hubs.

Heat Lamps in Brooders Cut Pig Losses



HEAT LAMPS in pig brooders tripled farmer Bishop's electric bill but saved enough pigs to offset small additional cost many times

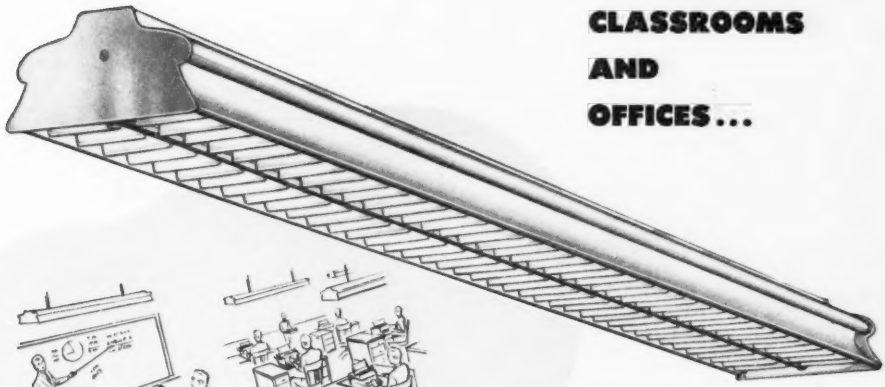
LAMPS are placed where pigs can stay warm on cold winter nights and still be out of danger of being crushed by the sow

WHEN THE serviceman called on farmer Ralph Bishop of Hamilton County, Ind., to see what was wrong —what caused kwhr use to jump to three times normal in a month, Mr Bishop said, "Look around and if you can find any way of cuttin' the bill, swell; but I know what's done it. It's the heat lamps in the pig brooders. And I haven't lost a pig since I put 'em there. Saving just one pig will more than pay the bill. If you can find a way to cut the bill, that's fine, but if you can't I still want heat lamps in my brooders when the pigs are little."

Farmers in the county have been quick to learn of the success of heat lamps in saving pigs. As a result, application of the lamps is spreading rapidly in Mr Bishop's area.

PUT THIS NEW "Ocular Comfort"

INTO CLASSROOMS AND OFFICES...

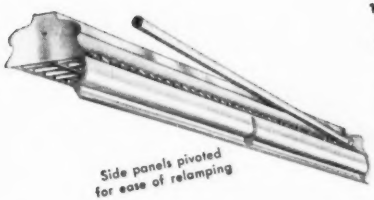


it's the latest Wheeler Slimline Fixture!

NOW you can get eight outstanding fixture features, all in one new Slimline Fixture. Wheeler's "Ocular Comfort" represents the accumulated design and engineering skill of almost 70 years in the specialized manufacture of lighting equipment. It meets a demand for:

1. **All metal construction** ... *no glass or plastics ... nothing to break or distort*
2. **Indirectly-illuminated side panels** *of smooth metal ... easily cleaned — no dirt-catching perforations*
3. **Low surface brightness**
4. **Pivoting side panels** ... *for ease of relamping (see illustration at left)*
5. **One-piece bottom louver** ... *never needs to be disturbed except for access to operating equipment*
6. **Better-than-average shielding** ... *35° both crosswise and lengthwise of fixture*

7-8. Pleasing appearance *plus high efficiency*



Side panels pivoted for ease of relamping

"Ocular Comfort" Slimline Fluorescent Fixtures are made for use with the 75 watt, 96" T12 Slimline lamp and the 40 watt 48" T12 single pin lamp. Both lamps instant-starting type. Lampholders—depressable type. Be sure to get all the details of this new product of Wheeler "Skilled Lighting". Write, *Wheeler Reflector Company, 275 Congress St., Boston 10, Mass.* ... also New York, N. Y. Representatives in principal cities.

Distributed Exclusively through Electrical Wholesalers

Wheeler REFLECTORS

"SKILLED LIGHTING"

MADE BY SPECIALISTS IN LIGHTING EQUIPMENT SINCE 1881

Kansas City Aims at Title "Best Lighted City"

JOHN HEINRICH, street lighting engineer, Kansas City Power and Light Co, compares old (left) and new refractors providing an average of 0.66 ft-c with only 60 lm per linear ft

DEAN SIMS
Kansas City Power & Light Co
Kansas City, Mo.

KANSAS CITY is nearing 50% completion of a street lighting program which, it is believed, will make it the "best lighted city in America." With 110 miles of modernized lighting on traffic arteries already installed, officials of the city and the Kansas City Power and Light Co are already seeing the fruits of their labors.

Plans for modernization call for:

1. Relighting major arteries for safety, using nighttime accident experience as the basis for priority. (The city issues orders to the power company step by step with this as its standard for determining what section of the program comes next.)

2. Installing lights in residential areas which were not already lighted.

3. Replacing old residential lights with new and more efficient units.

New type luminaires, mounted 25 ft above pavement surface, were used for the modernization program. Although the old system provided 120 lumens per linear foot along the street the result was only 0.36 ft-c average on the street.

About 200 lamps a month are installed in favorable weather. The slowest part of the work is in the residential areas, where much new installation work is necessary with conduits, cables and often new pole lines. As of May 31, a total of 5,746 new lamps had been installed. When the job is completed, there will be about 14,000 new lamps.

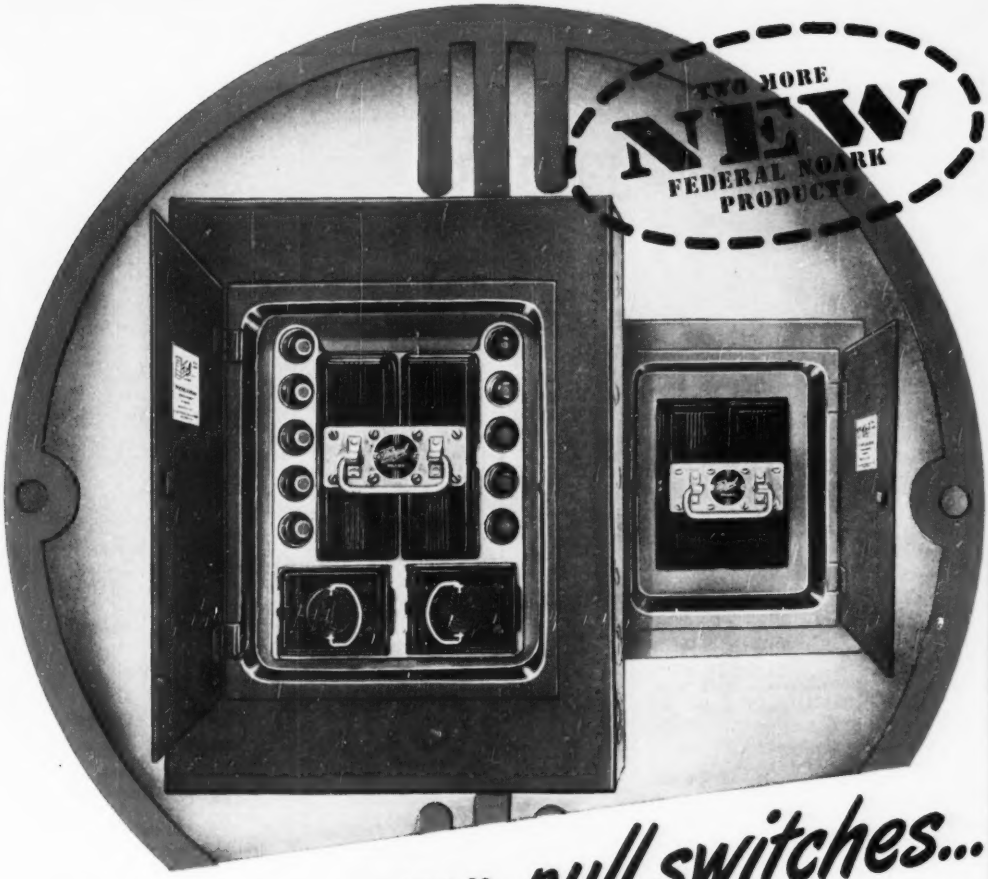
Cost of the new installations is being borne entirely by the Kansas City Power & Light Co. Total investment in street lighting equipment when the project is completed is estimated to be about 4½ million dollars. While the new lights will give four times the illumination of the old, increase in cost to the city will be only about 13%. The comparatively slight increase in the city's light bill results from lower rates granted by the company in negotiations with the city. At present, the light cost is $552,000 per year, and with the new lights it will be $626,000. In 1940, before lower rates went into effect, the cost of the old lights to the city was $640,000 per year, or $14,000 more than the new lights will cost. More light for the same cost played an important part in selling the street lighting improvement and expansion program.

1¢ Buys a Lot of Electricity

EMPHASIS on the low cost of electric service features current advertising and publicity of the Northern States Power Co. The theme, "1¢ buys a lot" of electricity is arrestingly expressed in novel newspaper advertising copy. The attention-getter in each advertisement is a really artistic etching-type picture of some well-known natural or man-made wonder of the world—Yosemite Falls, Statue of Liberty, Taj Mahal, etc—with a couple of tourists down in the corner saying, "Isn't it wonderful." To which Reddy Kilowatt replies, "Yes—but in Minneapolis 1¢ worth of electricity will wash 2 tubfuls of clothes," or will perform any one of various services in the home.

YES—but low cost of electric service is a wonder, too; and these ads emphasize this

The 1¢ theme is also exploited in a clever little booklet, circular in shape, about 5 in. in diameter, and with copper-colored covers on which the figure 1¢ is printed, nothing more. On the 24 inside pages is told what 1¢ worth of electricity will do in home conveniences. New customers receive a pamphlet detailing the company's services, and again explaining a penny's value in terms of electricity.



2 new 100 amp. pull switches...

Federal Noark 100 Amp. Main-and-Range Pull Switch...
Federal Noark 100 Amp. Pull Switch

THESE ADDITIONS to the Noark line brings you brand new opportunities to capitalize on Federal Noark engineering and construction. Features that help make these new switches outstanding are:

Federal Noark 100 Amp. Main-and-Range Pull Switch...attractive yet low cost. Single enclosure has capacity for: Main; 100 ampere pullout, 125/250 volt A.C., 3 wire, SN.

Branches; (a) two 60 ampere (or one 60 ampere and one 30 ampere) pullouts, 3 wire, SN, for range and water heater.

(b) Ten plug fuses, 2 wire, SN branches for lighting circuits.

Bus extension lugs permit sub-feeding to other centralized load panels. Split neutral bars, located beside the rows of plug-fuse terminals, save valuable wiring time—simplify wire identification.

Federal Noark 100 Amp. Pull Switch . . . specially designed for compactness to fit small spaces. Sturdy, simple construction. No hinged joints. Completely dead-front . . . even with puller head out, all live parts are shielded.

Order these new switches from your distributor. And write for full descriptive literature. Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

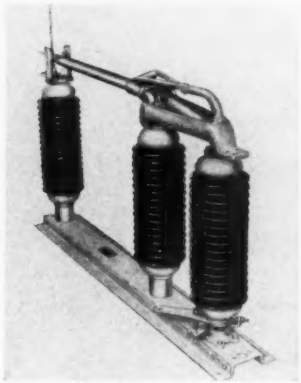
Federal NOARK

FEDERAL NOARK

100 AMP. MAIN-AND-RANGE AND 100 AMP. PULL SWITCHES

Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct ★ Sales offices in principal cities.

NEW EQUIPMENT



Disconnect Switch

A NEW AIR DISCONNECT SWITCH Type TTR-49 features a sealed pressure hinge contact. This type of construction eliminates a second contact or flexible connection at the hinge. According to the manufacturer, the design of the hinge includes high thermal capacity silver to copper contacts which are reported oxidation-free, enclosed and weather sealed. The blade is operated by a tubular one-piece drive crank. A universal counter balance accommodates upright, inverted or vertical base mounting.

Ranges of sizes at present are: 400, 600 and 1200 amp up to 34.5 kv and 600 (illustrated) and 1200 amp to 69 kv.

RAILWAY AND INDUSTRIAL ENGINEERING CO, GREENSBURG, PA.

•

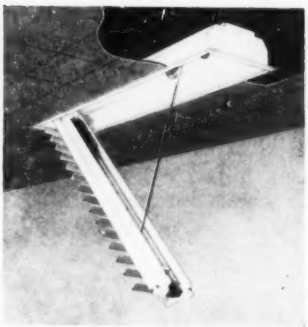
Pole Butt Ground Plate

SPIKED PROJECTIONS on a new type pole butt ground plate penetrate the earth and, according to the company, reduce resistance more than 15% compared with a flat plate of equal size. The ground plates are used to protect poles from lightning, ground neutral conductors at each pole, and ground transformers, switch bases, and lightning arresters.

Two types of plates are available. One uses No. 6 copper ground wire, stapled to the pole and brazed to the plate, to make the ground connection. In the other type, a split bolt connector on the plate provides the ground wire connection. Plates are 32-in. copper sheeting, 7½ in. square, and have a center hole through which they are nailed to the pole.

A. B. CHANCE CO, CENTRALIA, MO.

•



RECESSED TROFFER—Ladderless maintenance is a feature of recessed troffers that open and swing down for changing lamps and starters from the floor. Reflector assemblies can be added from the floor after the channels have been installed.

EDWIN F. GUTH CO, 2615 WASHINGTON AVE, ST. LOUIS 3, MO.

•

Street Lights

OLD LIGHT-POSTS can be utilized with single fluorescent "Lites" or with "Cluster Lites" which are manufactured completely wired, ready for attachment to 110 or 120-v service circuits. They can also be used in outdoor lighting of restaurants, theaters, and similar buildings.

Company reports that light from the "Post-Lites" fans out horizontally, saving about 60% light loss at the pavement and preventing second-story light nuisance. For new installations, 2-in. pipe set in concrete is the only base construction required. Output of the three tube sizes available is 18,400 lm, 13,800 lm, and 9,200 lm.

W. H. LONG CO, 108 W. ILLINOIS ST, CHICAGO 10, ILL.

•

Automatic Water Heater

AN ATTACHMENT is available which converts an ordinary tank or range boiler into an automatic electric water heater.

When attached to the side of the tank the unit takes the place of the stove or other heat source in maintaining the water at any predetermined temperature. Unit is available in both 115 and 230-v models.

CRANE ELECTRIC INDUSTRIES, DESK EW, 1690 W. 6TH AVE, EUGENE, ORE.

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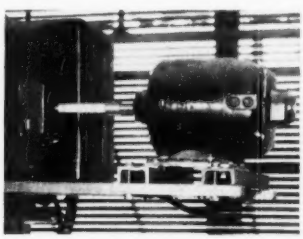


Tachometer Generator

ACCURATE SPEED measurement of steel and aluminum mill machinery, mine hoists, crushing and shipboard equipment, paper-mill drives, and similar machinery can be made with a d-c tach-

DRIVEPOINT!

NOW!
Hubbard Pole Line Hardware is being packed according to the new E. E. I. PACKING STANDARDS

look for it on all
HUBBARD BOLTS

How it helps YOU!

Easier, faster starting of nuts.
Acts as a Drift Pin.
Protects thread when bolt is driven out or when stud bolts are driven in.
Drivepoint finds the hole—easier, quicker installation.
Costs no more than ordinary machine or crossarm bolts.

HUBBARD AND COMPANY
PITTSBURGH CHICAGO OAKLAND CALIFORNIA

LET OUR CUSTOMERS* TELL YOU WHY THEY USE the CHANCE 8-way Anchor

"easier to expand"
"easier to spread in hard earth"
"LESS LOSS FROM DAMAGE"
"... they withstand additional strain ..."
"WE LIKE THE 8-WAY"
"less effort spent in spreading"
"our men like to use the 8-way better than any other"

*Names on request.

Yes... the Chance 8-way Anchor gives you better anchoring for less money. Greater load distribution, due to the cone shape and the close proximity of the blades, makes this new anchor more powerful than other types of expanding anchors. Simplified construction makes the 8-way easier to expand and more applicable to varied soil conditions. This simplicity also saves on manufacturing costs—and this saving is passed on to you!

Investigate the Chance 8-way Anchor—you'll agree with others—"It's the best buy on the market."

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO·

CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

ometer generator. Generator, which operates in either direction, is totally inclosed and utilizes an alnico permanent-magnet field.

Output voltage is proportional to speed. Power is reported sufficient for (1) control purposes and operation of an instrument simultaneously, or (2) operation of several instruments in parallel.

Speed ranges for the three models available are 100-1,450 with accuracy of 0.3% full scale, 100-2,500 and 100-5,000 rpm accurate to 1% full scale.

APPARATUS DEPT, GENERAL ELECTRIC CO, SCHENECTADY 5, N. Y.

•

Strain Insulator

TENSION APPLIED to a wood strain insulator causes a four-way squeeze on the wood. End-checking is said to be prevented by plates which almost completely enclose the wood to make up the fittings.

Standard assembly consists of one

COMING
In the Next Issue

AIR CIRCUIT BREAKERS
Interrupting capacities of 15,000 and 20,000 amp rms

"ROUGH-USAGE" AMMETER
No binding posts—wire slipped through case opening

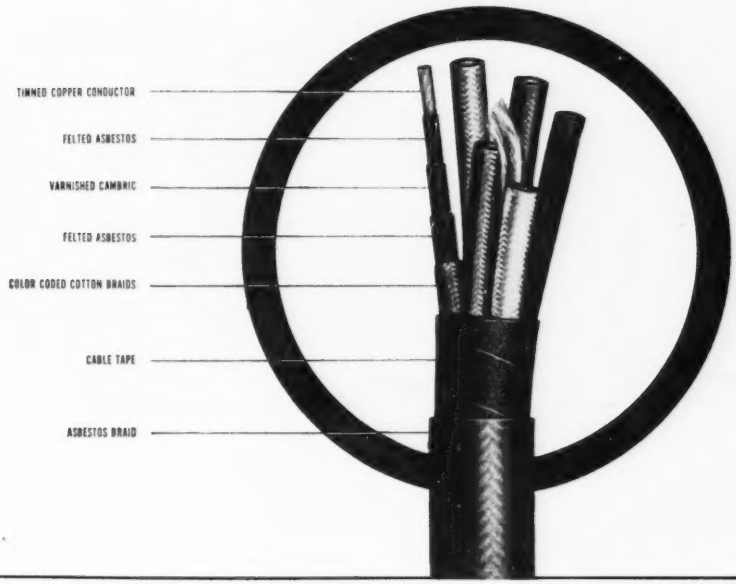
BATTERY CHARGER
Designed for almost any type of industrial truck

SOUND POWERED PHONE
No outside power needed for 30-mile communication

POTENTIOMETER
Intended for corrosion investigation in the field

INSULATING MATERIAL
Vinylite compound for Types T and TW insulation

This Just Goes to Show...
with cable, it isn't the cost
—it's the upkeep!



An Eastern Electric Utility used single conductor ROCKBESTOS AVC Wires and Cables for years.

But for "economy" they had been using ordinary low temperature control cable in their generating stations on vital control circuits to main steam boilers — burner tilt mechanisms and main power valves.

These circuits are close to steam lines — where it's hot! *Ordinary* control cables didn't stand up.

Convinced that ROCKBESTOS AVC . . . *Asbestos-Varnished-Cambric* . . . Permanent Insulation pays for itself in longer life, less maintenance and fewer outages, the Company has now replaced the ordinary control cable in this hot spot with ROCKBESTOS Table MD AVC Control Cable.

It will pay *YOU* to know the ROCKBESTOS story! Write.

ROCKBESTOS PRODUCTS CORPORATION
NEW HAVEN 4, CONN.

NEW YORK CLEVELAND DETROIT CHICAGO
PITTSBURGH ST. LOUIS LOS ANGELES OAKLAND, CAL.

WIRES and CABLES by

ROCKBESTOS

. . . . dare to be better

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

Westinghouse

MAINTENANCE SERVICE

Your nearest Westinghouse Manufacturing and Repair Plant—one of a network of 36—is expertly manned and completely equipped for both regular and emergency repairs of all kinds of electrical apparatus.

FAST

Electrical Repairs

ALL OVER THE MAP—AROUND THE CLOCK

No matter where or when you may need fast repair service on your electrical equipment, you can get it from Westinghouse. Our newly-expanded organization makes this an accomplished fact.

Strategically placed at the hubs of all the important industrial areas, Westinghouse Repair and Maintenance facilities are co-ordinated to give you faster service than ever before.

Our Manufacturing and Repair Plant nearest you uses factory-trained personnel and factory methods to do the job the quickest possible way. For your major equipment, our Field Service Engineers diagnose trouble and make speedy repairs in your own plant. In addition, you get prompt shipment of genuine Westinghouse Parts from our local Renewal Parts Warehouse.

If a breakdown occurs, we can and will handle it. We work overtime whenever that is needed. For example, when lightning recently struck a 100-hp, 2,300-volt induction motor vital to the operation of the main water-pumping station in a Southern city, we completely rewound the motor in 2½ days.

Fast Westinghouse Service is available for all classes of customers—including Electric Utility, Transportation, Mining, Industrial, Marine and Aviation. Let us help you in solving your special maintenance problems. Contact your nearest Sales Office or M & R Plant. Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-94821

All Westinghouse Renewal Parts are manufactured to original specifications—using the latest materials produced by our research facilities—with the care taken in the manufacture of the original equipment.

To protect the operation of Westinghouse apparatus and insure fast service, genuine Westinghouse Renewal Parts are stocked in 33 Renewal Parts Warehouses conveniently located throughout the country.

TAKIN' THE HIGH ROAD?

OR THE LOW ROAD?

CHOOSE COLLYER

For OVERHEAD or UNDERGROUND service, Collyer Self-Supporting Aerial Cable and Collyer Suprene Type RR Underground Cable deliver the power efficiently and economically. These two cables have many real advantages — they're low in cost, easy to install, and built to give uninterrupted service, year in and year out. Each of these cables is specially designed for its job . . . to stand up and take plenty of punishment under actual operating conditions.

AERIAL SELF-SUPPORTING CABLE:

Messenger and cable preassembled at factory, if desired • Ready for rapid installation • Can be spliced hot • Practically eliminates tree trimming • Oil-base, moisture and corona resistant insulation • Tough, pliable neoprene jacket • Resistant to moisture, sunlight, abrasion, impact.

UNDERGROUND SUPRENE TYPE RR CABLE:

For direct burial in the earth, or for installation in conduits • Low water absorption rubber insulation • Smooth, rugged neoprene jacket • Light weight, easy to tap and work • Excellent protection against soil acids, chemicals, alkalies.

Write for information

Collyer INSULATED WIRE CO.

245 ROOSEVELT AVENUE • PAWTUCKET, RHODE ISLAND

sheave wheel and one clevis end. Arcing horns are included unless otherwise specified. Minimum breaking load of 15,000 and 30,000 lb are available in accordance with overall lengths which vary in seven sizes from approximately 5 ft, 10 in., to 11 ft.

HUBBARD AND CO, 6301 BUTLER ST, PITTSBURGH 1, PA.

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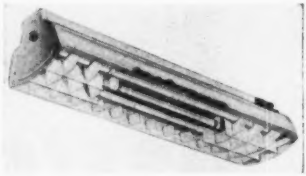

"SUNLIGHTER"—The "Sunlighter" embodies a sun lamp as well as two fluorescent lamps. Manufacturer states that it is a reproduction of the mid-ultraviolet wave lengths of sunlight and recommends the lamp for classrooms, gymnasiums, hospitals, and factories.

LEADER ELECTRIC CO, 3500 N. KEDZIE AVE, CHICAGO 18, ILL.

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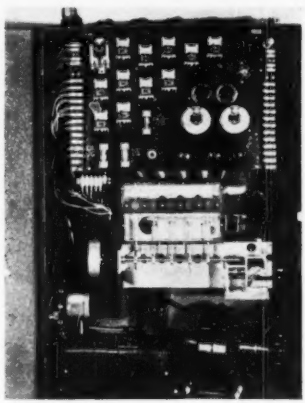


Smoke Detector

A MULTI-SPACE smoke detector for use in unfrequented plant areas has been developed which will protect four spaces simultaneously. An analyzer tube and a control cabinet comprise the detector. The control cabinet shown contains an electric panel with automatic supervisional circuits, constant voltage transformer, exhaust fan, and motor-driven selector valving system. Accumulators which draw continuous streams of sampling air are installed in the ceiling in protected zones.

If smoke reaches 3% in any air sample, the valving mechanism stops and fire alarm rings. Space from which the alarm originated is indicated by a

CRESCENT'S NEW STAPLE PULLER

SAVES TIME, MUSCLE, MATERIALS!

Sharp jaws grasp staples with a slip-proof grip and remove them undamaged for reuse.
Legs straddle and prevent damage to moulding, permitting reuse.

● This new Tool makes it easy to remove ground wire moulding from poles . . . and salvage both staples and wood moulding, undamaged. Like all Crescent Linemen's Tools, No. 15 Staple Puller is practical in design, well-balanced, and ruggedly constructed. The long handle provides powerful leverage which makes operation easy and fast.

Order from your regular supply source or write us.

Crescent's No. 15 Staple Puller is constructed of drop-forged steel, carefully heat-treated. Handle of black, ribbed rubber, bound at both ends with brass ferrules, and equipped with carrying and hanging ring. Rust-resisting, cadmium plate finish; overall length, 20"; shipping weight, 3-3/4 lbs.

EVERYBODY RECOGNIZES QUALITY by this Trade-mark

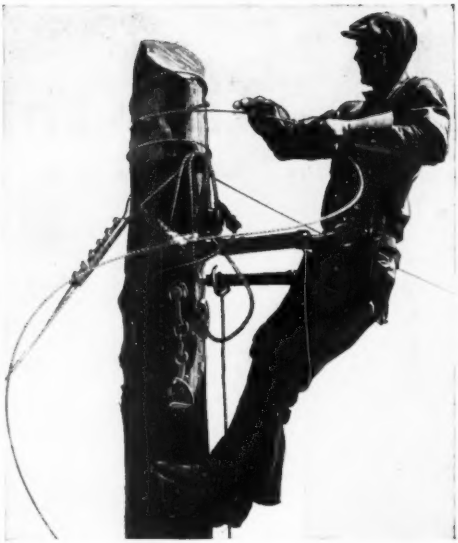
CRESCENT TOOLS

Sign of the Artisan
Symbol of Excellence

"Crescent" is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

Has What It Takes



For Guys, Messenger and Overhead Ground Wire

EXPERT linemen know, when they use *Crapo* Galvanized Steel Strand, that it will meet every requirement the job demands. For *Crapo* Galvanized Strand "has what it takes" — *strength, ruggedness, workability, long-life.*

These essential characteristics, combined with ever important ECONOMY, make *Crapo* Galvanized Strand first choice for guys, messenger and overhead ground wire. The superior tensile strength of the steel is utilized to fullest advantage in each size and grade. The heavy, ductile, tightly-adherent galvanized coating — applied by the famous *Crapo* Process — provides dependable protection for the steel, prolongs the expectant life of the strand.

The all 'round reliability and overall economy of *Crapo* Galvanized Strand are matters of record with leading strand users. Such records contain ample and significant proof of the long life and low annual cost of this strand in service.

Available for Prompt Delivery

There is a size and grade of *Crapo* Galvanized Strand for every practical need. Consult the distributor of *Crapo* Galvanized Products near you or write for further information!

INDIANA STEEL & WIRE COMPANY
MUNCIE, INDIANA

Crapo GALVANIZED STEEL STRAND

numbered wheel. Smoke concentrations under 3% set off a trouble alarm.

WALTER KIDDE & CO. BELLEVILLE, N. J.

•

Induction Motors

A LINE OF induction motors, ranging from 20 to 75 hp, makes use of a stator frame of solid rolled steel. It is claimed that the solid frame permits the motor to be wall or ceiling-mounted with equal protection.

Both squirrel cage and wound-rotor types (drip and splash-proof) are being produced, with sleeve or ball bearing brackets available.

WESTINGHOUSE ELECTRIC CORP. BOX 868, PITTSBURGH 30, PA.

•

Cable Connectors

A LINE of type SK compression cable connectors has been introduced which can be installed with a common compression tool. Sizes range from No. 6 to 4/0-7 strand conductors.

Other advantages claimed for these connectors include equal distribution of current, use of baffle to prevent corrosive acid migration, larger contact area, and a contact sufficiently tight to keep out oxide films.

ROYAL ELECTRIC MFG. CO. 1122 E. 87TH ST. CHICAGO 19, ILL.

•

Oscillograph

A LIGHTWEIGHT OSCILLOGRAPH has been designed for industrial and college laboratories. It can be used either for visual indications or for taking oscillograms of current and voltage.

The standard two-element model

A New Slimline Lighting "Element"

the DIRECTOR

by Smithcraft

AN "AREA-OF-LIGHT" SOURCE

Director, by Smithcraft, is a louvered fluorescent lighting "element" . . . an extensive, yet unobtrusive, "area-of-light" source, which effectively develops the advantages of the new 75-watt instant-start T-12 8-foot lamp. Director is available for two, three, four and six T-12 96" 75-watt lamps; two, three, four and six T-8 96" Slimline lamps; and, in matching units, for two, four and six T-12 40-watt lamps with instant-start ballasts. This unit provides a downward component of light varying from 70% for the two-light unit to 55% for the six-light unit. Cutoff from lamp glare is 35° lengthwise and 30° crosswise from the rigid and square louvers. The Director can be surface or pendant mounted, individual or continuous rows. Director is constructed of electrolytic zinc-coated bonderized steel and finished in white supercoat baked enamel with more than 85% reflectivity. Maintainance and installation are effectively simplified in the Director — another new and outstanding fluorescent unit by Smithcraft — manufacturer of "America's finest lighting fixtures" and the leader in progressive lighting design.

Smithcraft

LIGHTING DIVISION

CHELSEA 50, MASSACHUSETTS

The 7-Range Clip-On Volt-Ammeter

FERRANTI

Offers These Important Advantages

- Measures up to 1000 amps—up to 600 volts.
- Convenient ONE HAND operation trigger action.
- Thumb operated range selector switch.
- 7 ranges—5 current and 2 voltage.
- Insulated core—shockproof construction.
- Takes cables up to 2¼" diameter.
- Distinct calibrations—easy to read.
- Suitable for 50-70 cycles.

RANGES: 0-10 *amps*; 0-25 *amps*; 0-100 *amps*; 0-250 *amps*; 0-1000 *amps*; 0-150 *volts*; 0-600 *volts*.

FERRANTI ELECTRIC, INC.
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
FERRANTI, LTD., Hollinwood, England — FERRANTI ELECTRIC, LTD., Toronto, Canada

DEVALUATION
OF POUND STERLING
REDUCES PRICE OF
FERRANTI
7-RANGE CLIP-ON VOLT-AMMETER

WE are pleased to announce that effective immediately we can offer a substantial reduction in price on this superior instrument. The new low price reflects the full reduction in our cost resulting from the lowered dollar value of the pound sterling. It involves absolutely no change in the superb qualities of the instrument itself. Take advantage of this truly exceptional value now.

FERRANTI

FERRANTI ELECTRIC, INC.
30 ROCKEFELLER PLAZA — NEW YORK 20, NEW YORK

(three or four elements can be furnished) uses an improved galvanometer with bifilar suspension which produces high-flux density in the gap. It is supplied with a film pack for processing one or more records before the complete set of negatives has been exposed. A special film holder can be furnished which produces finished oscillograms in less than one minute without the use of a darkroom. More information in Bulletin GEC-580.

APPARATUS DEPT., GENERAL ELECTRIC CO., SCHENECTADY 5, N. Y.

•

UNIT SPLICING KITS—Cable splicing materials, labeled for identification, for all types of cables and joints (except gas or oil-filled high voltage) are available in unit kits. Complete data and information on all types of special and standard two-way splicing kits may be obtained in a series of engineering bulletins.

G & W ELECTRIC SPECIALTY CO., 2280 DANTE AVE., CHICAGO 19, ILL.

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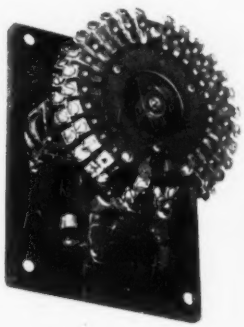


Lighting Controls

A NEW SELECTOR switch control and a redesigned master control contactor, with which no special transformer is required, have been introduced for use with 24-v lighting control systems. Selector switch consists of a multi-pole,

UNITED STATES RUBBER COMPANY

BEYOND COMPETITION

Developers and manufacturers of better electrical wires and cables for every need

LAYTEX RU—the world's smallest diameter, lightest weight natural rubber covered building wire.

NEOLAY RU—with Laytex insulation *plus* Neoprene. Nylon cover makes pulling 5 times easier.

LAYTEX RUW—the building wire with the insulation resistance that *increases* in wet locations.

CONTROL WIRES—Insulated with Laytex RU for greater circuit integrity.

NEOPRENE COVERED SERVICE ENTRANCE CABLE—Flame-retardant, moisture resistant—the first ever accepted by Underwriters' Laboratories, Inc.

MUNICIPAL SIGNAL CABLES—Insulated with Laytex RUW for maximum moisture-resistance.

AUTOMOTIVE CABLE SETS

BATTERY SEPARATORS

USEX NON-METALLIC—Finest non-metallic sheathed cable ever made, incorporating the extra protection of Laytex Insulation.

POWER CABLES—of every description, including Neolay Aircraft Wire.

ALUMINUM WIRES AND CABLES—U. S. Rubber introduced insulated aluminum conductors.

UNDERGROUND CABLES—The famous Grizzly line of tough cables.

ELECTRIX PLUGS—U. S. Rubber was a pioneer in the development of soft rubber plugs for cord sets.

ROYAL MASTER PORTABLE CORDS and many other types of electrical wires and cables.

ROYAL MINING MACHINE AND LOCOMOTIVE CABLES—Tested seven different ways to insure complete dependability.

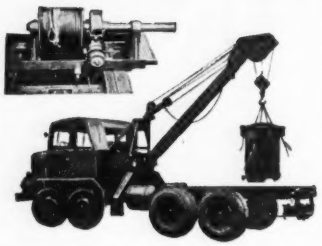
USKON—ELECTRICAL RADIANT HEAT FROM THE CEILING

UNITED STATES RUBBER COMPANY • ELECTRICAL WIRE & CABLE DEPARTMENT

1230 Avenue of the Americas • Rockefeller Center, New York 20, N. Y.

Utilities Have Specified
SILENT HOIST Equipment
• Since 1918 •

KRANE KAR **Swing Boom Mobile Crane: for materials-handling . . . lifting, transporting, positioning, gasoline or Diesel, 1½, 2½, 5 and 10 ton capacities, 9 to 37 ft. booms (or telescopic booms), solid or pneumatic tires. Self-stabilizing without jacks or outriggers; unobstructed vision; fast, flexible, safe, easy to operate.**



WINCHES: Capstans; Single and Double Drum, Jaw Clutch, Keyed and Friction Clutch Winches. 2,000 to 50,000 lb. Capacities.

SWING BOOM CRANES: Truck: Motor Power Operated; high capacity;•takes up only a small space. For handling transformers, cable reels, lamp posts, trees, poles, manhole castings, etc. 9 to 31 ft. booms; one to 10 ton capacities.

TOWERS: 2 or 3 section type and Pantograph types, with plain, revolving or racking platforms.

TRIPOD POLE DERRICKS: for 35 ft., 45 ft., and 60 ft. Poles; single piece or telescopic side legs; removable cast steel fittings.

USERS: AT&T; N. Y. Tel. Co.; T.V.A.; Consolidated Edison Co.; W.U.; Municipalities throughout America.

WRITE FOR CATALOGS:

No. 79—KRANE KAR *No. 70—Truck Equipment*

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

1½, 2½, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO.

862-63rd ST., BROOKLYN 20, N. Y.

rotating type switch mounted on a single-gang switch plate, and one single-station "off" and "on" switch. Rotating member is 2-circuit, 9-station, and can be used for manual selective control as well as master control.

Movable contact arms of the master control contactor (shown) are driven by a 24-v, 320 ma, 60-cycle, motor geared to operate at 15 rpm. Twenty-three of the 24 contact points can be used to control the low-voltage relays of a master system. Last point can be used as a clearing contact to the motor.

SQUARE D CO, 741 N. MILWAUKEE ST, MILWAUKEE 2, WIS.

MORE NEW PRODUCTS
about which you should know

SYLVANIA ELECTRIC PRODUCTS INC, 60 BOSTON ST, SALEM, MASS., has a new **starter,** FS-12, especially designed for use with the 32-w Circline fluorescent lamp. . . . CORAL DESIGNS, BOX 248, FOREST HILLS, N. Y., is manufacturing a line of electronic **relay switches** for industrial controls and gaging devices; contact ratings controlling 5, 10, or 35 amp at 115 v are obtainable in one-tube units.

TRUMBULL ELECTRIC MFG CO, PLAINVILLE, CONN., is marketing a NTPR **panelboard** for group and branch circuit control of lighting distribution for industrial and commercial applications. It is available with 6 to 42 circuits; more details in Bulletin TEC-4. . . . FASCO INDUSTRIES INC, 350 N. UNION ST, ROCHESTER 2, N. Y., has an expanded line of automatic reset **circuit breakers** for battery chargers, electroplating circuits, and other 6, 12, or 24 v operations. Can be supplied singly, or in multiples of 2, 3, and 4 with ratings of 8, 10, 15, 20, 25, 30 amp.

ADALET MFG CO, 1450 E. 49TH ST, CLEVELAND 14, OHIO, has perfected a "Grip Seal" armored cable **connector** for use with interlocked armored cable in sizes to 750 Mcm, 3c, at 15,000 v. . . . ACME ELECTRIC CORP, CUBA, N. Y., offers a 75-w lamp **ballast** for 96-in. T-12 slimline lamps with a minimum of 700 v starting and 195 v operating, 0.425 amp.

CLIPPARD INSTRUMENT LABORATORY INC, 1125 BANK ST, CINCINNATI, OHIO, has an automatic capacitance **comparator,** Model PC-4, that allows an unskilled operator to grade, sort or calibrate to within 0.2% accuracy as many as 8,000 capacitors a day; range from 10μμf to 1,000 μf. . . . LITECRAFT MFG CO, 104 S. FOURTH ST, BROOKLYN 11, N. Y., is producing a line of recessed incandescent round and square **lighting fixtures** in 60 models and seven sizes.

IRVINGTON VARNISH AND INSULATOR CO, IRVINGTON 11, N. J., is making an insulating **tape,** types R-12 and R-20 Silastic Tape, for insulation and electrical wires and cables; available in two thicknesses and five widths from ½ in. to 2 in. for temperatures from —70 F to 500 F. . . . GENERAL ELECTRIC CO, APPLIANCE AND MERCHANDISE DEPT, BRIDGEPORT 2, CONN., is producing a portable electric **heater** for providing heat over a wide room area; called the Sahara, it has an aluminum reflector that directs heat from two elements over a 180-deg area.

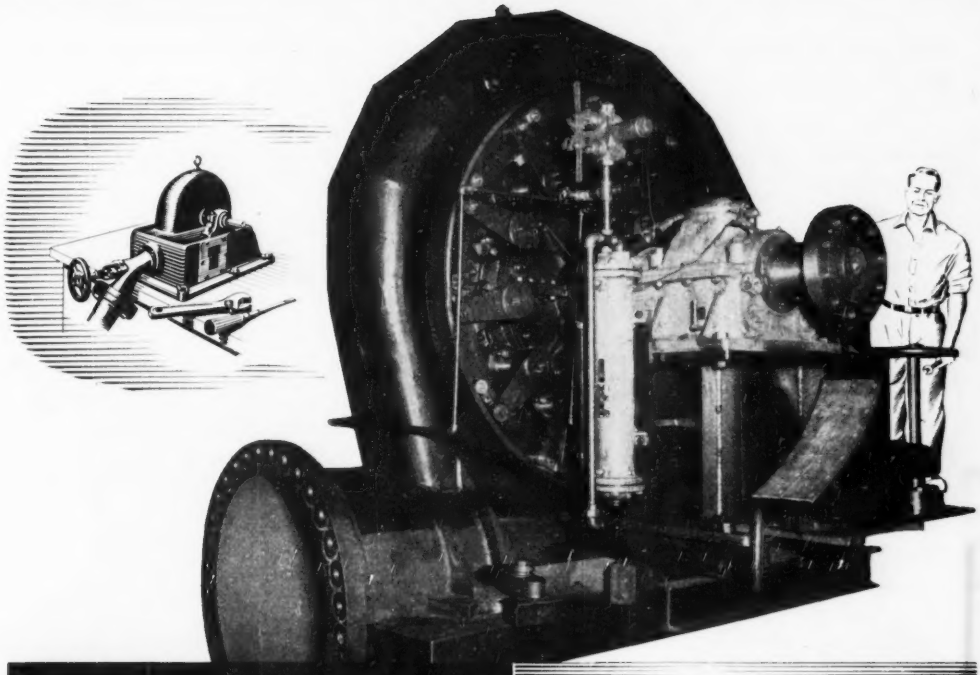
WESTINGHOUSE ELECTRIC CORP, BOX 868, PITTSBURGH 30, PA., has designed universal type electronic **detecting relays** intended to operate from low-power initiating circuits or contacts . . . Westinghouse also has a 25-w **lamp ballast** in two sizes for single or two-lamp luminaires made specifically for the 33-in., T-12 fluorescent lamp; operates at about 55% power factor.

WARD LEONARD ELECTRIC CO, MOUNT VERNON, N. Y., has announced general purpose multiple **magnetic relays** with 2 or 3-pole double-throw relays and silver contacts; sizes to 115 v, a-c or d-c. . . . EUTECTIC WELDING ALLOYS CORP, 40 WORTH ST, NEW YORK 13, N. Y., offers **Eutectrode 6000** for single or multiple pass welding where fit up is poor; high burnoff rate permits faster welding speeds with high currents.

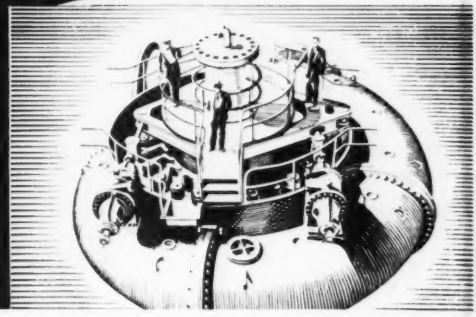
CRESCENT TOOL CO, JAMESTOWN, N. Y., has a large size **wire grip,** No. 386, with a capacity of 0.625 to 1 in., 12,500 lb, both corrugated and smooth jaw type. . . . FASCO INDUSTRIES, ROCHESTER, N. Y., is making a portable **electric drill** with rated capacity up to ¼ in. steel and ½ in. wood; motor operates on 110-120 v, a-c or d-c.

GENERAL ELECTRIC CO, SCHENECTADY 5, N. Y., has announced a line of Permafil d-c paper-dielectric **capacitors** useable to 100 C with no derating; ratings of 0.1 to 10.0 μf at 600, 1,000, and 1,500 v. . . . THE MICEL DISTRIBUTING CO INC, 118 E. 25TH ST, NEW YORK 10, N. Y., has placed an 18-lb **microfilmer** on the market for use in mircofilming inventory and assessment records, personal history files, and similar data.

IDEAL INDUSTRIES INC, 1021 PARK AVE, SYCAMORE, ILL., has a porcelain wire **connector,** Model E-1, for joining wires up to 4 No. 18, particularly useful in production wiring. . . . HOTSTREAM HEATER CO, 2363 E. 69TH ST, CLEVELAND, OHIO, has introduced an automatic electric water heater **control set** that can be plugged in to a 110-v, a-c outlet; 1,000-w element reported to provide recovery of 7½ gal per hr, 60 F temperature rise.



BALDWIN
HYDRAULIC TURBINES
All sizes for all applications



No matter how large or how small a water-power development you are considering—Baldwin can provide a turbine unit to fit!

OUTPUTS. Baldwin is equipped to build turbines in a range from small fractional horsepower water motors up to the largest units that can be shipped.

HEADS. Baldwin can furnish turbines for any required head—from the highest to the lowest.

TYPES provided by the line include impulse, propeller, Francis, and Kaplan (adjustable blade) units.

Baldwin offers a century of sound, practical engineering experience gained in hundreds of previous jobs . . . experience that has helped contribute to the technical progress of an industry, and helped produce some of the most advanced developments in hydraulic turbine equipment.

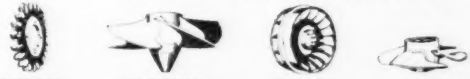
For a concise, comprehensive picture of the Baldwin turbine line, ask for Bulletin 252. The Baldwin Locomotive Works, Philadelphia 42, Pa. The Pelton Water Wheel Co., 2929 Nineteenth Street, San Francisco, Calif.

The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Boston, New York, Philadelphia, Houston, St. Louis, Chicago, Cleveland, Pittsburgh, San Francisco, Seattle, Washington. In Canada: Baldwin Locomotive Works of Canada, Ltd., Toronto, Ontario.

BLW THE BALDWIN GROUP

BALDWIN

HYDRAULIC TURBINES



IMPULSE PROPELLER FRANCIS KAPLAN

NEWS ABOUT PEOPLE

Shepherd Elected V-P, Arkansas Power & Light

William M. Shepherd, for the past five years director of industrial development of the Arkansas Power & Light

WILLIAM M. SHEPHERD

Co, has been elected a vice-president of the company in charge of a newly created sales and development department.

Mr Shepherd started with the company in 1928 as private secretary to the late Harvey Couch, founder and long-time president of AP&L. Later he served as rural development director, safety director, and then as industrial development director.

The sales department and the development departments are being consolidated to form the new sales and development department.

•

J. Earl Herrington has been appointed executive secretary of the Western Society of Engineers, Chicago. Mr Herrington was associated for 12 years with the Chicago Bureau of Engineering.

Dr Clinton R. Hanna, associate director of the research laboratories, Westinghouse Electric Corp, Pittsburgh, has been awarded the Howard N. Potts Medal by the Franklin Institute. The award is being given in recognition of Dr Hanna's initiative in the conception and development of the tank gun stabilizer.

Harry W. Terry, consulting engineer of Scarsdale, N. Y., has opened New York City headquarters at 518 Fifth Ave, New York. Mr Terry is the designer of mechanical, electrical, and sanitary equipment for buildings for many architects, having conducted his practice in the New York area. St. Paul, Minneapolis, Chicago, and New York. Since separation from military service in 1945, he has been practicing engineering in the New York area as architects' consulting staff engineer.

•

Bragg Heads GE Pacific Coast Apparatus Dept

Arthur D. Bragg has been appointed Pacific District manager of General Electric Co's apparatus department,

ARTHUR D. BRAGG

with headquarters in San Francisco, succeeding Allen G. Jones, retired.

Mr Bragg has been both assistant district manager of the department on the West Coast and district manager of the Central Station division. He has been associated with GE since 1925.

Announcement has also been made of the retirement of **August H. Meyer** from his position in the sales organization of GE's lamp department after nearly 40 years of continuous service. Prominent in the lighting and electrical fields in Chicago and the Midwest, Mr Meyer for the past 15 months has served in an advisory capacity to managers of the Chicago and Midland sales districts, both with headquarters in Chicago. Mr Meyer was named president of the Chicago Lighting Institute early in 1948, after having served as vice-president for several years.

San Antonio Board Makes Engineering Appointments

City Public Service Board, San Antonio, Tex., has announced the appointment of Victor H. Braunig to the posi-

VICTOR H. BRAUNIG

tion of general manager of the board. Mr Braunig was formerly general superintendent of the electric department. Robert J. Foley, formerly superintendent of the electric distribution division, has been made general superintendent of the electric department to

ROBERT J. FOLEY

succeed Mr Braunig. Otto W. Sommers has been appointed executive assistant to the general manager.

Mr Braunig, who has seen 39 years service in the public utility field, joined the San Antonio Public Service Co, predecessor of the City Public Service Board, in 1910 as a student engineer.

Ryerson Steel Service Pays 4 Ways!

1. *Quick Delivery*

Maintenance jobs keep moving—production delays are avoided when you call Ryerson for promptly needed steel. Thirteen conveniently located Ryerson plants mean shorter shipping distances, assure fast delivery of your requirements to any point in the nation.

2. *Highest Quality*

Careful specifying and checking of all stocks assures uniform high quality—Ryerson Certified Steel. Careful handling of your orders by experienced personnel assures accurate compliance with your specifications.

3. *Large Stocks*

With large, diversified Ryerson stocks nearby, you can cut costs by holding your own inventory at a practical working level. Ryerson stocks serve as your inventory reserve. You can draw on these stocks for almost any current need.

4. *Complete Service*

To help you solve your steel problems, Ryerson steel specialists will gladly counsel with you. Their recommendations are backed by more than a century of experience. You can depend on us for prompt, personal service whether you need a single bar or a carload.

Principal Products

BARS—carbon & alloy, hot rolled & cold finished
SHAFTING—cold finished, ground & polished, etc.
STRUCTURALS—channels, angles, beams, etc.
PLATES—sheared & U. M., Inland 4-Way Floor Plate
SHEETS—hot & cold rolled, many types & coatings
TUBING—seamless & welded, mechanical & boiler tubes
STAINLESS—Allegheny bars, plates, sheets, etc.
REINFORCING—bars and accessories
MACHINERY & TOOLS—for metal fabrication

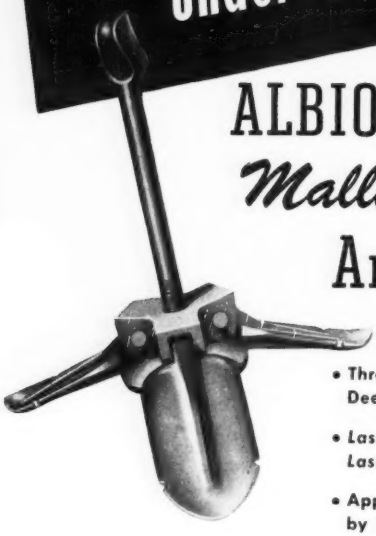
RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

For STEEL in a hurry call RYERSON

For

DEPENDABLE GUYING under All Conditions



ALBION-DILLON

Malleable Iron

Anchors

with these Features

- **Three Long Blades Extend Deeply in Solid Earth**
- ***Lasting* Strength Gives Them *Lasting* Holding Power**
- **Approved by R.E.A.—Selected by Leading Companies**
- **Economical in Price — Easy, Economical to Install**

There are good reasons why more and more companies are now specifying Albion-Dillon Anchors. Made of high-strength malleable iron for long-lasting strength, A-D Anchors prove outstanding for dependable guying under all conditions.

Three sizes—3″, 4″ and 6″, with two variations of blade spread in the 6″ size—are available.

Send for full details today!

Send for Folder!

Descriptive folder gives full details and specifications on A-D Anchors.

ALBION MALLEABLE IRON CO.

"One of America's Foremost Producers of Malleable Iron"

ALBION, MICHIGAN

He worked as switchboard operator in the old Villita St power plant and, following military service in World War I, returned to the Public Service Co and was made superintendent of the electric division in 1925. In 1943 he was made general superintendent of the electric department.

Mr Foley was employed by the San Antonio Public Service Co in 1918. After serving in various engineering capacities Mr Foley was transferred to the engineering department as electrical engineer in 1941. Returning to the services of the City Public Service Board in 1945, following four years in military service, he was made superintendent of the electric distribution department.

Mr Sommers has been associated with the City Public Service Board and its predecessor utility since 1929. Early this year he was appointed superintendent of the production division of the electric department.

•

Canadian Manufacturers Elect Brown President

Arthur L. Brown, manager of the general sales division, Northern Electric Co, Ltd, Montreal, was elected president of the Canadian Electrical Manufacturers Association at the annual meeting held recently in Montreal.

Mr Brown joined Northern Electric in 1919 and after serving in the Toronto, Halifax and the Winnipeg districts he was appointed general merchandising manager in Montreal in 1933. Seven years later he was appointed assistant general sales manager and in 1946 was made general sales manager. The following year he was made manager of the general sales division.

•

E. P. Hennek, formerly executive vice-president, has been elected president of the Western Light & Telephone Co, Kansas City, Kans. He succeeds **Arthur L. Mullergreen**, who has been named chairman.

J. D. Whittemore, formerly a vice-president of the Chase National Bank, Public Utilities Department, has become associated with Lehman Brothers as head of its public utilities department. Mr Whittemore has been active in the public utilities field during his entire business career. He has been associated with various public utility companies, including Rochester Gas & Electric Co, Niagara Hudson Power Co, Gardner Electric Light Co, Monongahela West Penn Power Co, Mohawk Hudson Power Corp, New York Power & Light Co, Utica Gas & Electric Co,

and Syracuse Lighting Co. Mr Whittemore has been associated with Chase National since 1932 and a vice-president since 1936. During part of the war years, he was on loan to various government agencies.

•

Named Technical Director, Atomic Power Division

Dr Charles M. Slack has been named technical director of the Westinghouse Electric Corp's atomic power division.

DR CHARLES M. SLACK

In his new position he will have staff responsibility for the general direction and coordination of all research and engineering work of the division.

His entire career with Westinghouse has been spent in the Lamp Division Laboratory at Bloomfield. He joined Westinghouse as a physicist in 1927, became assistant director of research for the division in 1943, and was named research director in 1946.

Edward G. F. Arnott has been named acting research director of the Lamp Division to succeed Dr Slack. For the past two years, he has been assistant director of the research department.

Another recent Westinghouse appoint included:

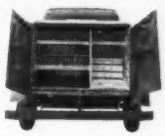
Guy Kleis has been made manager of the company's educational department, with headquarters at East Pittsburgh. In his new position, Mr Kleis will supervise university relations, student recruitment and the graduate student training programs.

•

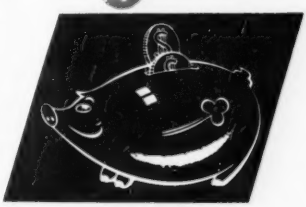
Dr Frank B. Jewett, for many years vice-president of the American Telephone & Telegraph Co and a past-president of the American Institute of Electrical Engineers, has been named to receive the 1950 medal of the Industrial Research Institute, Inc. The medal, established in 1945, is awarded annually for "outstanding accomplishment in leadership or management of indus-

the SAVINGS in LOWER
Maintenance costs
by using
YORK-HOOVER
BODIES
is just like
EXTRA
MONEY
in the
BANK

Model 2076



This light service body, designed for installation on a standard half-ton chassis, has convenient compartments for tools and materials. Drawers for small parts have adjustable partitions. Result: More efficient, cost-saving service work for you.



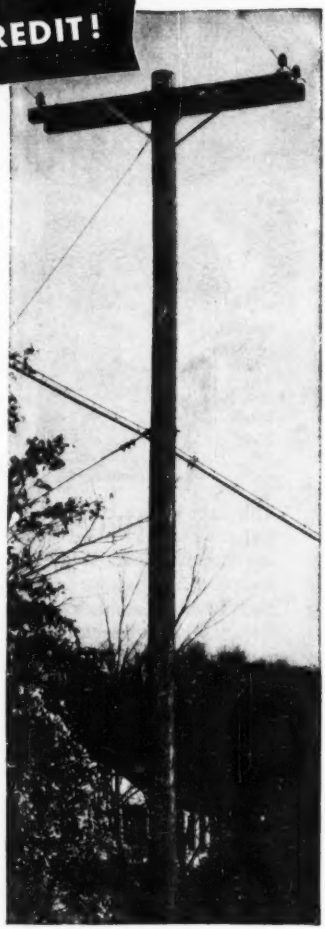
Write for the Model 2076 "facts" today!

YORK, YORK-HOOVER BODY DIVISION CORPORATION PENNA

CASE HISTORY

confirms 30-year service life for treated poles

...AND CREOSOTE GETS THE CREDIT!



HERE'S a convincing case history* concerning 71 pressure-creosoted pine poles—part of an electric power transmission line erected in Kansas in 1917.

In 1947, after 30 years in line, 68 out of 71 poles were still sound and serviceable—furthermore, the inspection revealed that these poles appeared to be capable of service for some time to come. Of the remaining 3 poles, 2 had been removed because of line changes—1 had been damaged by lightning.

Of the original 71 poles, *not a single one had been removed because of decay*—a splendid testimonial to creosote. And all the more noteworthy when you consider that the preservative treatment used to protect these poles was somewhat lighter than is now regarded as good practice.

Creosote is the performance-proved, time-tested preservative for poles and crossarms. And for the best possible creosote delivery service, get in touch with the nation's largest distributor—Koppers. With 14 creosote-producing plants—with 4 large storage plants—Koppers can always meet your creosote requirements.

KOPPERS COMPANY, INC.
Pittsburgh 19, Pa.

* Wood Preserving News—1947

All Standard Specifications
For All Types of Wood Preservation

KOPPERS CREOSOTE...to be sure!

trial research which contributes broadly to the development of industry or the public welfare."

•

New Assignments

E. J. Burger, vice-president, director, and formerly division manager of Ohio Public Service Co, Cleveland, at Lorain, has taken over the position left vacant through the retirement of **E. L. Franklin,** vice-president, director, and division manager at Warren. **Earle R. Smith,** at the present time acting division manager at Lorain, and **Raymond Py,** acting sales manager, assume the positions of division manager and division sales manager. Mr Franklin has more than 47 years of utility service behind him. . . . **John Shaw** has been named chief of the public relations department of the B. C. Power Commission, Victoria, B. C. For the past three years, he has acted as executive assistant to the Hon George S. Pearson, minister of health and welfare. . . . **Alfred L. Fosie,** formerly connected with the Ticonderoga (N. Y.) Electric Co, has been appointed manager of the Alton division, White Mountain Power Co, Meredith, N. H. He succeeds **Raymond C. Duncan,** who has occupied that position for 39 years. . . . **C. Victor Mars,** formerly sales manager of the Ansul Chemical Co's industrial chemical division, has been named manager of the company's new product department. . . . **John G. Porter** and **Paul A. Wassmansdorf** have been appointed advertising managers for General Electric major appliances and traffic appliances, respectively, with headquarters in Bridgeport, Conn. Both men joined the advertising and publicity department in Schenectady in 1934. **Albert J. Brock** and **Arthur L. Scaife** are major appliance and traffic appliance merchandise managers, respectively. . . . **J. F. Fitzsimmons** has been named manager of the commercial research department of the Allis-Chalmers Mfg Co, Milwaukee. He succeeds **J. R. Reed,** who has resigned to establish his own business. Mr Fitzsimmons has been associated with A-C since 1943. . . . **Don Edge,** who has served as sales manager, REA department in Chicago since 1946, has been appointed Government sales representative in Washington for the Graybar Electric Co. . . . **E. A. Willson** has been appointed assistant to the manager of power production and system operation of the Northern States Power Co, Minneapolis, Minn. **Harry P. Bruncke,** formerly assistant superintendent, has been made superintendent of protection and electrical maintenance to succeed Mr Willson. . . . **William H. Compton,** manager of the Rockford (Ill.) sales

office, Reliance Electric & Engineering Co, Cleveland, for the past four years, has been made supervisor of standard motor sales with headquarters in the company's general offices in Cleveland. . . . **Alfred C. Viebranz,** formerly government sales representative for the electronics division, Sylvania Electric Products Inc, Boston, Mass., has been appointed special representative at Washington, D. C. . . . **A. P. Olches** has been made chief engineer of the Peabody Engineering Corp, New York. He has been associated with Peabody since 1928.

•

Frank E. Reeves has been appointed senior electrical engineer with Barnard & Burk, consulting engineers, Baton Rouge, La., in charge of electrical power plant design. Mr Reeves' previous connections include extended engineering service with the Boston Edison Co and several industrial organizations. He was recently on the staff of **Fay,** Spofford & Thorndike, Boston consultants, in connection with that firm's governmental work outside the United States. Before going to Baton Rouge, Mr Reeves was project engineer with Albert & J. M. Anderson Mfg Co, Boston.

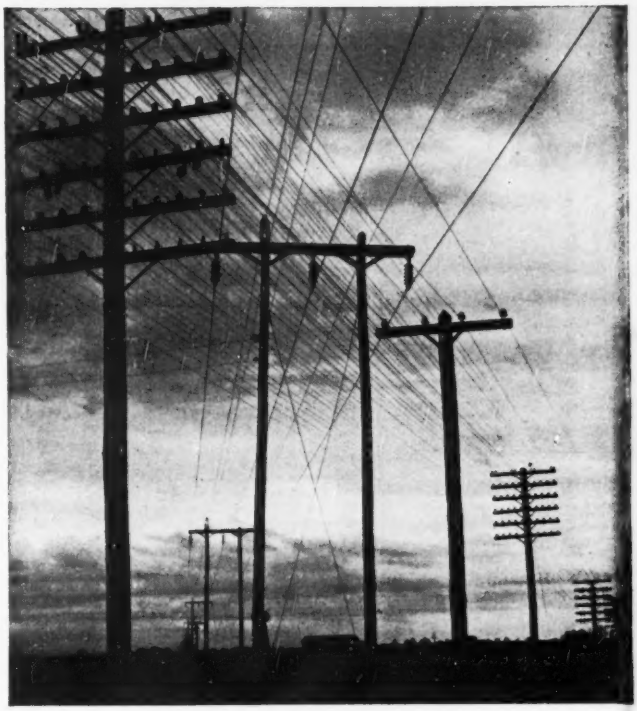
OBITUARY

John Forss, a vice-president of the Lake Superior District Power Co, Ashland, Wis., died at his home in that city on Sept 16.

Walter M. Bird, formerly operating vice-president of the Savannah Electric & Power Co, died on Oct 5 in Raleigh, N. C., of a heart ailment after an illness of two weeks. Mr Bird had been identified with the Stone & Webster utilities system since 1908. He was first connected with the Savannah properties from 1921 until 1923, and again from 1942, as head of the transportation unit until it was sold to the Savannah Transit Co. It was then he went to Raleigh as purchasing agent and assistant to the president of Carolina Coach Co.

Denney W. Roper, an engineer for more than 30 years with the Commonwealth Edison Co, Chicago, before his retirement in 1935, died on Oct 11 at his home in Carmel, Calif. He was 79 years of age. Mr Roper was widely known as an authority on underground cables and in the field of lightning protection. After holding various engineering positions, he served as superintendent of the street department from 1915 to 1933, when he assumed the duties of assistant electrical engineer in charge of the research division of the engineering department.

Let the storm come!



KOPPERS

Long-Life Poles and Crossarms can take it!

THE term "long life" most certainly applies to Koppers Pressure-Creosoted Poles and Crossarms. They last, on the average, more than thirty years, *even under severe climatic conditions.*

Koppers Pressure-Creosoted Poles and Crossarms are protected against decay — the greatest threat to strength and serviceability of wood. Naturally, by installing these strength-retaining, long-lasting poles and crossarms, fewer lines go out of service during storms or at night . . . when replacements are most dangerous and costly . . . when interrupted service is most inconvenient and serious to customers.

KOPPERS COMPANY, INC., **Pittsburgh 19, Pa.**

KOPPERS

Deliveries of Koppers Pressure-Creosoted Poles are made promptly from many conveniently located treating plants.

PRESSURE-CREOSOTED WOOD

MANUFACTURERS and MARKETS

ALLIS-CHALMERS' Boston Works at Hyde Park (Mass.) received notable anniversary honors Oct 7-11. All but one of the company directors attended, as did top-drawer officials of A-C. Festivities included a luncheon for 150 industry leaders, prominent engineers, utility men, and other clients at Hotel Somerset, Boston, with plant open house for officers, directors, employees, families of A-C workers, and civic groups. In the view above on the Hyde Park assembly floor (1) President Walter Geist; (2) William N. Dunn, employment supervisor, chief electrician and veteran of 47 years' service; (3) W. Emery Horton, test engineer and 46-year veteran; and (4) W. C. Johnson, executive vice-president of the company inspect the latest circuit breaker units with other company men

Exclusive-Dealing Pacts Hit Hard by Antitrusters

Exclusive dealing contracts are under heavy fire from both the Federal Trade Commission and the Department of Justice. Since last year, the antitrusters have drawn a bead on contracts covering a wide range of products.

Mostly these have been consumer products. But now the attack is spreading across the board to hit industrial products, too. Latest example: A cease-and-desist order against C. Lee Cook Manufacturing Co, Louisville, Ky., for selling its metallic compressor packings on the condition that purchasers not use any packings, or repair parts of competitors. The company specializes in parts and supplies for compressors used in the oil industry and by transmission gas pipe lines.

The scrap over exclusive dealing seesawed back and forth in the courts for years. Before the Clayton Act was passed in 1914, the Supreme Court had held that exclusive dealing was not a violation of the Sherman Act. And since the Clayton Act's specific ban on the practice, the government prosecutors have probably lost as many as they've won.

•

New Boiler-Tube Welding Process Is Developed

A new process for welding boiler tubes, reported to effect a large saving in time, has been developed at the Chattanooga, Tenn., plant of Combustion Engineering-Superheater, Inc. The new method not only provides the advantages of simplicity and time saving, but also makes possible a consistently high quality of weld, according to E. C. Chapman, chief metallurgist of the company. Boiler tubes of lengths in excess of 100 ft may be made by joining two or more commercial lengths of tubing. This process is capable of handling materials ranging from 1 in. to 10 in. diam, it is reported.

The principles of induction heating and pressure welding are both employed in the new process. A high frequency generator supplies power for the induction coil, the heating from which serves in effecting a pressure-type weld. A feature of the new apparatus is an enclosed atmosphere to protect the welding surfaces against oxidation during the heating period.

Both straight and bent tubing may be welded by this method, which is expected to be less expensive and more uniform than hand welding and avoids the complications of internal cleaning that is required when flash welding is used. By combining induction heating and pressure welding, pressure-type welds may be made without objectionable upsetting of metal in the welding zone.

MANUFACTURING BRIEFS

First scheduled program of color television broadcasts, a part of the Radio Corp of America's field tests, was presented last week in Washington, D. C., by RCA to demonstrate to the Federal Communications Commission and to the public the new RCA all-electronic, high-definition and completely compatible color television system.

"Unloading Poles Safely" is the title of a new film strip that has been produced by Employers Mutual Liability Insurance Co of Wisconsin, Wausau. Sixty-one pictures and an accompanying recording demonstrate the manner in which a potentially dangerous operation can be performed without injury or death. The film follows a crew through from start to finish as it unloads a flat-car of poles in a safe, professional manner.

AEC has signed a contract with the Western Electric Co, a subsidiary of the American Telephone & Telegraph Co, for the operation of the Sandia Laboratory at Sandia Base in Albuquerque, N. M. The laboratory will be transferred from the present operator, the University of California, to the Western Electric Co on Nov 1, 1949. The new contract is effective through Dec 31, 1953. Western Electric will operate the

Westinghouse

Fluorescent Lamps

NOW LAST 3 TIMES AS LONG!

...YET COST NO MORE!

SAVE 2/3

SAVE THIS – LAMP COSTS — **ONE LAMP NOW LASTS AS LONG AS 3.**

SAVE THIS – TIME SPENT REPLACING BURNED-OUT LAMPS — **LAMPS NEED BE REPLACED ONLY ⅓ AS OFTEN.**

Here's the biggest news in fluorescent lamps that's come along in years . . . NOW Westinghouse fluorescent lamps will last 2½ years in average store installations . . . 3 years in average one-shift office or factory installations.

Light output, too, has been improved—Westinghouse fluorescent lamps now burn brighter and longer than ever before. So, when you buy lamps, buy Westinghouse and save! Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J.

YOU CAN BE SURE... IF IT'S

Westinghouse

POWER-PACKED FOR HEAVY DUTY

New WELLER 250-watt Soldering Gun

Heavy jobs and light jobs—the new 250-watt Weller Soldering Gun speeds them all. Chisel-shaped RIGID-TIP provides more soldering area for faster heat transfer. New "over-and-under" terminal design gives bracing action to tip. Your Weller Gun does delicate or heavy soldering with equal efficiency; compact and lightweight, it gets into the tightest spots.

Weller Guns actually pay for themselves in a few months. Fast 5 second heating means no time lost. Trigger-switch control means no current wasted —no need to unplug gun between jobs. Prefocused spotlight and longer length let you *see* the job and *reach* the job with ease. No other soldering tool offers so many time-and-money-saving features. Order your new 250-watt Weller Gun from your distributor today, or write for bulletin direct.

SOLDERING GUIDE

Get your copy of "SOLDERING TIPS"—new fully illustrated 20 page booklet of practical soldering suggestions. Price 10c at your distributor's or order direct.

WELLER MANUFACTURING COMPANY

817 Packer Street, Easton, Pa.

Sandia Laboratory through a new, wholly-owned subsidiary, the Sandia Corp.

J. W. Dice Co, formerly located at Grand View-on-Hudson, N. Y., has announced removal of its headquarters to 1 Engle St, Englewood, N. J.

Pennsylvania Transformer Co, Pittsburgh, has added four new sizes to its line of Pole Star distribution transformers. The new units, rated 37½, 50, 75 and 100 kva, extend the Pole Star line from 3 kva through 100 kva.

Sylvania Electric Products, Inc, has adopted a new theme for its Lighting Center at 500 Fifth Ave, New York. The six rooms and three alcoves have been designed to show effective modernization of a 30-year-old home.

"In spite of its great accomplishments in the past, the electrical manufacturing industry has just scratched the surface in Canada," stated Arthur L. Brown, newly elected president of the Canadian Electrical Manufacurers Association. "We still have frontiers to push forward, both in the laboratory and in the field," he said.

For the first time since 1942, lamps for Christmas trees and other Yuletide decorations will be in full supply. To assist merchants, municipalities, churches, clubs and householders, who are planning Christmas lighting displays, General Electric has issued a Christmas lighting package, which contains suggestions for conducting a Christmas lighting contest and two publications, one on home lighting and the other on community lighting.

A definite step in the direction of exporting American technical "know-how" along the lines proposed by President Truman in Point Four of his inaugural address and recently presented to Congress has been taken by Combustion Engineering-Superheater, Inc, New York, in a program of cooperation with one of Italy's largest industrial companies, Franco Tosi, S.p.a. of Legnano. In addition to making available the American company's designs, the program provides for the communication of technical and manufacturing information, such as drawings, test data, and material specifications. It will also further the purposes of the Marshall Plan in that certain sub-contracting work for steam generating units, previously purchased from Combustion under ECA, will be carried on in Italy.

Unnecessarily high electric bills and inefficient operation of electric equipment are the price a great many American

serve growing electric loads economically with system planning!

Here's how EBASCO engineers can help you plan the expansion of your system—to serve adequately present and expected loads and be readily adaptable to potential growth and technological advances. They take all factors into account, assuring you minimum overall operating costs and maximum useful life.

EBASCO specialists study your present system, markets, load growth and customer service requirements. They coordinate the planning of required additions and revisions to the three components of the system—*power supply—transmission—distribution*. They bring a fresh *objective* approach and application of advanced practices to each problem they tackle—along with diversified experience in the development and operation of all types of utility systems and power pools.

EBASCO engineers will develop several alternative plans with comparisons of investments, investment costs, operating costs, evaluated service and other factors. You get a complete report on which management can act with assurance. It advises you on *when*, *what* and *where* to build. *Write for a booklet describing* EBASCO *services and facilities.*

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farmers are paying for the continued use of obsolete and inadequate electric wiring systems, according to J. H. Oliver, farm electrification expert of GE. Speaking recently before a group of electricians studying farm wiring at the University of Minnesota's farm, St. Paul, Minn., Mr Oliver pointed out that a great many present day farms were wired originally for lights and a few small appliances only.

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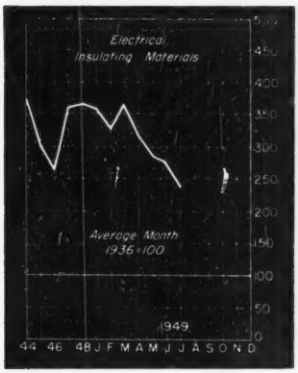
July Insulating Materials Sales Move Downward

Sales billed on electrical insulating materials during the month of July, 1949, decreased from the total recorded



for June, 1949, according to figures released by the National Electrical Manufacturers Association. The index compiled by NEMA, moved downward to 240 from 282, which represents a decrease of 15%.

In July, 1948, the index stood at 323, this year's figure representing a drop of 26%.

•

Manufacturer Introduces Stylized Slot Insulators

Standardization by means of definite styles, a new development in the marketing of fabricated paper parts for insulation of armature or rotor slots, has been announced by Insulation Manufacturers Corp, Chicago.

Fourteen standard styles, covering the most popular types of slot insulators, have been developed. These include plain, scored, cuffed, and formed styles. Many different paper materials are available. The slot insulators will be sold under the trade name, "Inmanco."

Five distributors have been appointed to market the product in the United States and Canada.

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NEW ELECTRICAL CONSTRUCTION

NEW ELECTRICAL construction projects announced by private and government utility systems involving more than $70,000. Also listed are major industrial and construction jobs where electrical work is included

UTILITIES

Proposed Construction

Arizona—Bureau Reclamation, Dpt. Interior, Phoenix, circuit breakers, disconnecting switches, horn-gap switches for substations at Pumping plants 1, 2 and 3 power supply to Wellton-Mohawk Division, Davis Dam Proj. and Gila Proj. Spec. R3-PX-23 (Region 3). L. N. McClellan, Bldg. 1-A, Denver Federal Center, Denver, Colo., ch. engr.

Colorado—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., transformer, circuit breaker, switches, disconnecting fuses, fuse cutout, lightning arresters, current transformers and demand meter for Hoyt Substation, Colorado Big Thompson Proj., Spec. R7-74 (Region 7). L. N. McClellan, ch. engr.

Kansas—Western Co-operative Electric Assn., Wakeeney, rural distr. lines, Ellis, Gove, Ness, Sheridan and Trego Counties, **$660,000.** Frank Horton & Co., Lamar, Mo., consult. engrs.

Minnesota—Itasca-Mantrap Co-operative Electric Assoc., Park Rapids, 44 mi. rural distri. lines and sys. imprvs., Hubbard Co. **$270,000.**

Montana—Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Louisville, unity - power - factor, alternating - current generators, main exciters, pilot exciters, thrust bearings and guide bearings, for Canyon Ferry Power Plant, Canyon Ferry Unit, Missouri River Basin Project, Spec. 2811. L. N. McClellan, ch. engr.

New Mexico—Jemez Mountains Electric Co-operative, Inc., San Ysidro, rural distr. lines and facilities, San Ysidro. **$3,975,000.**

New Mexico—Northern Rio Arriba Electric Co-operative, Inc., Chama, rural distr. lines, Rio Arriba Co. **$710,000.**

N. M., Los Alamos — U. S. Atomic Energy Comn., P.O. Box 1539, tunnel and access road, 5 mi. 20 ft. wide, gravel surfaced road, concrete lining 4,500 ft. tunnel, 16 ft. diam. through mountain, Inv. No. 291-50-27 Approx. **$800,000.**

N. Y., Newburgh—Central Hudson Gas & Electric Corp., South Ave., Poughkeepsie, steam plant to generate 60,000 kw. electricity at Dannskammer Point, **$12,000,000-$13,000,000.** Burns & Roe, 233 Broadway, New York, Zone 7, engrs.

North Dakota—Capital Electric Co-operative, Bismarck, 334 mi. rural distr. lines, Burliegh Co. **$440,000.** Ulteig Eng. Corp., 1114½ Front St., Fargo, consult. engrs.

O., Chillicothe—Columbus & Southern Ohio Electric Co., 215 N. Front St., Columbus, power substation near Scioto River between Brownell and Watts St., extended. **$500,000.**

Oklahoma—Southwestern Power Admin., c/o Lee Simmons, Barrett Bldg., Denison, ex., repairing, exten. electric power lines, out of Colbert area and from Denison Dam area north into sects. of Southern Okla. **$650,000.**

Oregon—U. S. Eng., 19 E. Poplar St., Walla Walla, Wash., design, mfg. and delivery of four 111,300 hp. hydraulic turbines for McNary Dam Power Plant: CIVEN45-45-164-50-40.

Wyoming—Bureau Reclamation, Dpt. Interior, Cody, transformers, circuit breakers, switches, disconnecting and bypass switches, disconnecting fuses, fuse cutout hookstick and fuse remover, portable recording voltmeter for Meeteetse substation, Missouri River Basin Proj., Spec. R6-COD-9. Extended date. L. N. McClellan, Bldg. 1-A, Denver Federal Center, Denver, Colo., ch. engr.

Low Bidders & Contracts Awarded

Calif., Palo Alto—City, City Hall, Oct. 3, electrical distr. street lighting water and gas distr. sys., from Palo Alto Dpt. P.

Wks., City Hall. **$203,675.**

Kansas—Lane-Scott Electric Co-operative, Dighton, 307.7 mi. rural distr. lines, to Douglas Contractors, Keeling Bldg., Omaha, Neb., **$289,073.** Bids 9/20.

Kansas—Radiant Electric Co-operative, Inc., Howard L. Bell, mgr., Fredonia, 301 mi. rural distr. lines, Wilson Co., 56 mi. conversion lines, to Crescent Electrical Co., 808 Delaware St., Kansas City, Mo., **$389,944.** Est. $325,000. Bids 8/9. Awarded 8/16.

Minnesota—Agra Lite Electric Co-operative, Benson, approx. 17 mi. rural distribution lines in Big Stone and Swift Counties. Force account. Approx. **$150,000**

Minnesota—Meeker Co-operative, Light & Power Assn., Litchfield, L. Clinton, mgr., Oct. 3, labor and materials, tie lines and convert about 80 mi. rural distr. lines, Meeker Co., from Duane Constr. Co., Pelican Rapids, **$114,018.** Banister Engr. Co., 1549 University Ave., St. Paul, engr.

N. Y., Brentwood—Bureau Contracts & Accounts, Albany, Oct. 5, electrical work for turbine generator set, Power House Bldg. No. 35 at Pilgrim State Hospital from Turbine Equipment Co., 75 West St., New York, Zone 6, **$132,457.**

Oregon — Benton-Lincoln Electric Co-operative, 561 Van Buren St., Corvallis, 74.41 mi. rural distr. lines, Benton and Lincoln Counties, to Lacy Electric Constr. Co., Builders Exchange Bldg., Portland, **$143,530.** Bids 9/23, awarded 10/3.

INDUSTRIAL, COMMERCIAL & PUBLIC BUILDINGS

Proposed Construction

Conn., West Haven—U. S. Eng., Bldg. 21, U. S. Naval Drydock, South Boston, Mass., 9 story GM hospital complete with chapel and assembly hall, 7 story TB hospital with chapel, auditorium, station garage and repair shop, 2 duplix quarters 1 car garage for managers office, etc. on 63 acre site between West Spring St. on south Terrace Ave. on north and exten. along Campbell Ave., Serial No. Eng-10-016-50-5, for Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C. $14,000,000-$16,000,000.

Md., Baltimore—Catholic Archdiocese of Baltimore, Archbishop's Residence, Charles and Mulberry Sts., cathedral, cathedral rectory, school and convent, Charles St. Ave., **$8,000,000.**

Mass., Boston—Port of Boston Auth., Commonwealth Pier 5, South Boston, reconstruct Boston and Albany Terminal, Pier 2, East Boston, **$7,500,000.** Fay-Spofford-Thorndike, 11 Beacon St., consult. engrs. W. T. Donovan, 261 Square Bldg., staff engr.

Minn., Minneapolis—Veterans Admin., Vermont Ave. between H and I Sts., Wash. 25, D. C., 8 story, Veterans Hospital addn. $7,000,000.

Mont., Galen—State Tuberculosis Sanitarium, Dr. F. I. Terrill, supt., plans by Gus Link of J. G. Link & Co., Butte, and Andrew Van Teyllingen, Great Falls, 2 wing addn. on hospital and apartment, sewage disposal, enlarged water and sewage lines. **$3,000,000.**

Mont., Polson—Idaho-Montana Pulp & Paper Co., Polson, paper mill, **$2,500,000.** L. A. DeGuere, Wisconsin Rapids, Wis., engr.

N. Y., Brooklyn—Dpt. P. Wks., Municipal Bldg., New York, Zone 17, plans by Shreve, Lamb & Harmon Assoc., 11 W. 44 St., New York, Zone 18, 11 story, penthouse supreme court bldg., Adams St. **$10,000,000-$12,000,000.**

N. Y., New York—New York Life Insurance Co., 51 Madison Ave., 2 story garage, on block bounded by Second Ave., E. 64 St., Third Ave., and E. 65 St. **$4,000,000.**

O., Cincinnati—Bd. Comrs., Hamilton and Bd. Library Trustees, Courthouse, plans by A. Morton Githens, 623 N. Columbus Ave., Mt. Vernon, N. Y., library, **$6,000,000.** Bodenstein & Schusler, 9 and Main Sts., consult. engrs.

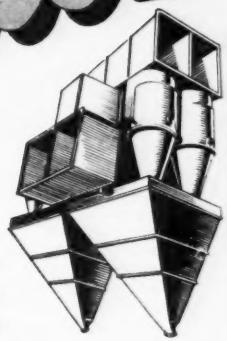
Low Bidders & Contracts Awarded

La., Baton Rouge—State Div. Admin., Capitol Annex, Baton Rouge, eight 1 story concrete, brick bldgs., Southeast Louisiana State Hospital, Hy. 190, to R. P. Farnsworth & Co., 1515 S. Salcedo St., New Orleans, **$2,570,034.** Bids 10/5.

Tex., Houston — Sakowitz Bros., 720 Main St., 4 story mercantile bldg., to Tellepsen Constr. Co., 1710 Telephone Rd. Approx. **$7,000,000.** Bids 9/26.

The Straight-line Approach to Collecting

fly-ash



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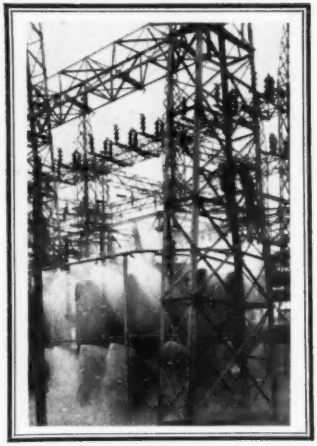

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RECENT RATE CHANGES

Union Electric Power Co, Monsanto, Ill., has been authorized by the Illinois Commerce Commission to increase electric rates of 125 power users in the East St. Louis-Alton area by approximately $36,200 a year. In the company's Keokuk area twelve large power users will be increased approximately $7,200 a year. Commercial customers will have an overall reduction of $1,600 a year. The addition of fuel adjustment clauses in rate schedules and contracts accounts for most of the increases in both the East St. Louis-Alton and Keokuk areas.

Tell City, Ind., officials have asked the Indiana Public Service Commission for authority to adjust its rates on electric energy sold to the city of Cannelton.

North Carolina Public Utilities Commission has completed its hearings on an application by the Carolina Power & Light Co for a rate increase on its industrial customers.

•

New Sales Assignments

Westinghouse Electric Corp has established a field office of the Sturdevant Division in Birmingham, Ala., in the Brown-Marx Building, with V. E. Barnes in charge.

Cornell-Dubilier Electric Corp, South Plainfield, N. J., has announced that N. M. Mintz and Associates, 7357 Cottage Grove Ave, Chicago, are continuing to represent the power factor division of the company. The new sales office opened by Cornell-Dubilier at 605 West Washington Boulevard, Chicago, will represent the company in all other products except power factor.

Automatic Control Co, St. Paul, Minn., has appointed A. T. Timmerman, 759 N. Milwaukee St, Milwaukee, Wis., as representative for eastern Wisconsin and Michigan peninsula territory.

Lincoln Electric Co, Cleveland, has assigned sales and engineering responsibility in the Indianapolis area to E. E. Goehringer as district manager. The Indianapolis office of the company is located at 3343 Central Ave.

Electrical Engineers Equipment Co, Melrose Park, Ill., has appointed W. J. O'Brien, 1611 Exchange Bldg, Memphis, Tenn., to represent it in Arkansas and Tennessee.

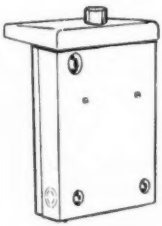
Buchanan Electrical Products Corp, 1290 Central Ave, Hillside, N. J., has appointed William H. Caswen, 2320 North Florida St, Arlington, Va., sales representative in the District of Columbia and in the States of Maryland and Virginia. F. O. Hoyt Co, 4 South 15th St, Philadelphia 2, Pa., has been made sales representatives in Delaware, southern New Jersey, and eastern Pennsylvania.

Day-Brite Lighting, Inc, St. Louis; Mo., has appointed N. O. Reed to represent it. He will maintain headquarters in Houston, Tex., and will cover the Houston territory under H. A. Auchter, Texas representative, who is located in Dallas.

Protection for
METERS and METERING CONNECTIONS with
KEES Outdoor Meter Boxes

Designed to give *complete* protection, and to insure quick installation and servicing of outdoor meters.

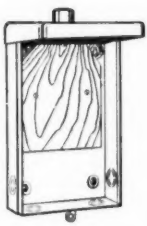
WEATHERPROOF Safety



All cover joints overlap. Top cover is a solid, one-piece stamping . . . no joints to allow leaking.

TAMPERPROOF Safety

Front cover is held in place by concealed lugs and a latch which may be sealed or padlocked. Attempts at tampering are easily detected.



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POWER CAPACITORS

By R. E. Marbury

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2. This book assembles for your convenience data on the design, manufacture and use of power capacitors. It covers those designed for 60 cycle power circuits—the high frequency types for frequencies up to 12,000 cycles—and capacitors for high voltage AC and DC power circuits. The author discusses their operating limitations, their respective fields of application, and their function in improving power factor. $3.50.

MAINTENANCE MANUAL OF ELECTRONIC CONTROL

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3. Here is a practical installation, maintenance, and service manual for the electrical and electronic technician. Designed to bring you best methods and practices in the field of electronic control, this book takes you from the very simplest electrical circuit through the more complicated circuits of electronic motor control and welding control. It explains the use and adaptation of tools and instruments for electronic equipment trouble shooting, and the installation, maintenance, and servicing of specific types of equipment. $4.50.

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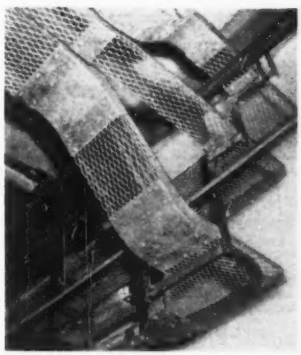
THE T. J. Cope INC. REPORTER

Written by Edgar W. Baird, Jr., President T. J. Cope, Inc., Philadelphia, Pennsylvania

Every time I sit down to write one of these informal reports to the industry, I have a moment's hesitation that in always harking back to my favorite subject — Cost Reduction — some reader may say, "Gee, that man's getting to be something of a bore." Then I give a second thought to the very fundamentals that have made American Industry the greatest productive power the world has ever known. These fundamentals have always been, and today must be, the driving desire to produce *more* and *better* products at lower cost. It's these fundamentals that have given us a Standard of Living never before conceived.

With that preamble, I want to say a few words on the COPE CABLE TROUGH



—another money saver—for supporting control cables in generating stations and gauge piping in industrial plants.

We had for sometime been working on various types of Cable Trough designed by different engineers for these purposes. If you could have seen some of the detailed blueprints which passed through our engineering and estimating departments, you could easily realize the large engineering expenses involved in just getting ready to buy. All of these specialty designs necessarily require expensive installation costs of cutting, fitting and welding in the field.

Then we decided to standardize on the best possible type of construction and to design all the necessary fittings to carry cables or tubing up, and down, and around, and across in every direction and in various dimensions. We can now supply the industry with a product which can be ordered as easily as pipe. No detailed engineering work is required when a piping layout is made, because it is understood that all types of pipe fittings to meet the various requirements are available out of stock—that is also what COPE STANDARD CABLE TROUGH supplies.

COPE TROUGH, with its great diversity of fittings and through the use of the Cope Connector for attaching any standard parts, requires only a hack saw and a 1/4" wrench, as erection tools. This diversity of fittings — this simplicity of erection — spell only one thing — great labor saving, in both engineering and erection — hence reduced costs.

There are many outstanding installations of COPE CABLE TROUGH. There are customers who have ordered and reordered and reordered. We have photographs of some of these existing installations, and we have a very complete descriptive pamphlet. Many of our customers would be pleased to have your engineers inspect their installations, as they are proud of them.

If you are as interested in this important subject of Labor Saving and Cost Reduction as we are, why don't you sit down and either tell us your problems or ask us for further information? We're always glad to supply information because, like our customers, we also are proud of COPE STANDARD CABLE TROUGH.

May I hear from you?

Many thanks.

E. W. Baird Jr.

President

T. J. COPE, Inc.

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● SWITCHES: Types TW-20 and TW-30 large-capacity outdoor air switches group-operated rotating-insulator type, 7.5, 15, 23 and 34.5 kv, 2,000 and 3,000 amp, are described in Catalog 125. Distinctive features, switch-assembly details and operating data are all discussed in this 4-page catalog. Pacific Electric Mfg Corp, 5815 Third St, San Francisco 24, Calif.

● REGULATORS: Bulletin K-2325 describes section interlock regulators designed to provide precision speed control for coordinated motor drives used in processing at high speed various materials in web form. Principles of operation, integral motor mounting, and related features of this equipment, called the SIR Regulator, are reviewed and four typical installations pictured. Reliance Electric & Engineering Co, Cleveland, O.

● TRANSFORMERS: Data on various types of indoor and outdoor current transformers, indoor and outdoor potential transformers and outdoor metering outfits are contained in a 32-page bulletin, 61B7168. Allis-Chalmers Mfg Co, 932 S 70th St, Milwaukee, Wis.

● RELAYS: Mercury plunger relays are described in a four-page folder, Bulletin No. 48. Outline drawings, photographs and technical data are shown in detail. Ebert Engineering & Manufacturing Co, 185-09 Jamaica Ave, Hollis 7, Long Island, N. Y.

● CEMENTS: A six-page bulletin describes various electrical cements and pictures actual applications on equipment and appliances. Sauereisen Cements Co, Sharpsburg Station, Pittsburgh 15, Pa.

● ANODES: A descriptive folder, M-8500A, presents information on "National" ground anodes and backfill material for use in cathodic protection and electric grounding. Carbon and graphite ground anodes are discussed for cathodic protection applications and as electrical ground connections in installations such as solvent tanks, automatic telephone exchanges, railway signal systems and lightning protection systems. The bulletin describes the sizes and grades of graphite and carbon anodes available and outlines their application, installation and operation. National Carbon Co, Inc, Room 1328, 30 E. 42d St, New York 17, N. Y.

● TRUCKS: A four-page bulletin, B49-1-A, illustrates and describes a new Carry-All, an all-steel, all-purpose service and utility body. The bulletin, a guide to the selection of service bodies, pictures various ways by which the carry-all, with the addition of one or several pieces of optional equipment, may be adapted to serve the needs of most light industries. Morrison Steel Products, Inc, 601 Amherst St, Buffalo 7, N. Y.

● MOTORS: PB 5600-1, four-page bulletin on Fabri-Steel, high-speed, synchronous motors with direct, belt, or gear drive, contains descriptive matter and photographs, explaining features of rotor and stator. Mechanical modifications also are illustrated. Elliott Co, Electric Power Dept, Ridgway, Pa.

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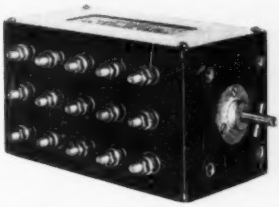

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LETTERS TO THE EDITOR

Don't Blame Mame

To the Editor of ELECTRICAL WORLD:

Why does the electrical industry continue to burden the electric range with the entire cost of revamping a jammed, skimpy, overloaded, jalopy, fuse blowing, haphazard, two wire entrance?

In the early days, when the use of electricity in the home was limited to a few slow heating, low-wattage appliances and spotty, tough-on-the-eyes lighting, the purchase of an electric range was responsible for the need for a 60-amp switch and three-wire service drop. But this is 1949 and we continue to talk the same lingo when the situation is entirely different.

It is no secret that, during the last decade, the public has been most willing to purchase new appliances and improve their lighting. The information is not confined to the industry that the increased use of electric service in the home has been tremendous. Every family is quite familiar with the fact that their own electrical habits have increased. But what about the out-of-date, out-of-sight out-of-mind wiring?

How about the natural trend within the manufacturing segment of the industry. Constantly they have attempted to improve the efficiency of their products. The old "lamp socket devices"... the 350- to 550-w toasters, coffee makers, waffle irons of yesteryear—the era of two wire services—have been jumped up 1,000 to 1,250 w to speed up the time of operation.

In 1940 the industry recognized this concentration of load in the kitchen, dining room and breakfast room of high-wattage appliances and changed the "*safety* code", requiring No. 12 wire leading to these rooms. Irons, ironers, hot plates and automatic washers forced the same ruling of No. 12 wire to the laundry. But how about the old houses, wired long before 1940, in which these same high wattage appliances are struggling along on No. 14 wire? If the proper 15-amp fuses were protecting these No. 14 wires, the popping of fuses within those houses would sound like a Fourth of July celebration. But all is quiet. Quiet because pennies and oversize fuses are silently but ineffectively filling the places of guards off the job. Aren't No. 12 wires needed in these old homes? If they are, will the two-wire entrances—like those shown on the cover of the August *Electrical Merchandising*—take care of the wiring repairs within the home? Not according to Section 2357 of the Safety Code.

Of course, the industry for years has been advising the customer to have adequate wiring—one of the most meaningless phrases ever coined so far as the public is concerned. But when the desire to own an electric range arrives in a home, we immediately tell the housewive that it will cost $100 or some other unreasonable figure, to install it. With one grand swoop we unload all the costs of a three-wire, 60-amp service onto the range.

We've been doing this so long that even the manufacturers of electric ranges accept the situation. They do accept it or their questionnaires, their promotional plans, their speeches and their daily conversations would not constantly refer to the unjust, burdensome cost of range installation. The jobbers believe it, too. So do the dealers. The result is we've done a pretty good job in convincing customers that it's true. Let's change our tune.

Changing of Fire Bells

The time is approaching in many homes when two-wire services and No. 14-wire circuits are going to break down. It will become an epidemic. An epidemic that will be accompanied by fire bells. In the meantime, we wait for these homes to buy an electric range so we can blame the range for the need for a third wire.

Instead of talking about wiring allowances for range installations and being perturbed about attending costs, wouldn't all members of the industry benefit—and certainly the customer—if all of us explained in simple, over-the-fence English that the roadways and highways over which electric traffic flows are jammed? Explain that, just like the network of state roads and highways, they must be repaired, broadened, made safe.

This industry of ours has a clean record of promoting the products that bring happiness and comfort to its public. We can do this job, too. Once the customers appreciate that these repair jobs on old wiring systems are necessary—the same as a leaky roof or an unsafe porch step—they will put them in order—if we use the right words. When that sensible decision is made, the door is opened wide for us to tell our story of Electrical Living, and the range will no longer be blamed for the expense of the third wire.

J. H. Van Aernam
New York Power & Light Corp
Albany, N. Y.

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Transformer manufacturer in the East Central States is further developing its power section and has an opening for an engineer experienced in the design and construction of power transformers (above 500 KVA). In answering state previous experience and salary expected. All replies will be held in strict confidence. Reply

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Electric utility company has opportunity for an Engineer experienced in rate schedule work. Should have a knowledge of costs, regulatory requirements, investments, and accounting. Prefer man with Electrical Engineering degree. Salary commensurate with experience. Our rate department employees know of this vacancy. Give all pertinent information in letter addressed to

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330 W. 42nd Street, New York 18, N. Y.

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GRADUTE ELEC. Engr. (Cooper Union) 1½ yrs. practical experience in power plant and distribution transformer design. Desires stable position requiring engineering background and business abilities; within commuting distance Columbia U. PW-1212, Electrical World.

WANTED

SALES MANAGER

By old established manufacturer of nationally distributed electrical equipment for construction and maintenance of power lines.
Must be thoroughly experienced in sales management—market analysis, product appraisal, territory assignments, jobber distribution. Electrical engineering background helpful but not essential. Age 38 - 50.

Substantial salary, bonus, and profit sharing arrangement.

Our sales organization knows of this ad.

Write SW-1160, Electrical World
520 N. Michigan Ave., Chicago 11, Ill.

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RW-9654, Electrical World
330 W. 42nd St., New York 18, N. Y.

Wanted by Manufacturer

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1—165 h.p. Bruce-Macbeth 4-cylinder vertical gas engine ser. #1065, 277 r.p.m., direct connected to 160 k.v.a. Westinghouse generator, 220 volts, 3 phase, 60 cycles with shaft mounted exciter.
3—250 h.p. Bruce-Macbeth 4-cylinder vertical gas engines, ser. Nos. 1077-8-9, 257 r.p.m., direct connected to 310 k.v.a. Westinghouse generators, 440 volts, 3 phase, 60 cycles.
1—Bruce-Macbeth tandem engine generator unit consisting of 2-250 h.p. 4-cylinder vertical gas engines ser. #2039-2040, 257 r.p.m., direct connected to 435 k.v.a. Westinghouse a.c. generator, 2400 volts, 3 phase, 60 cycles and belt driven exciter.

Prices and Additional Information Upon Request

R. D. Zumwalt
TEX-O-KAN FLOUR MILLS CO.
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500 Used Fractional Horse Power DC Motors.
500 Used Thompson Watthour Meters.
One (1) 1000 HP Diesel with 325 V. 2000 A 315 RPM DC Generator.

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By order of the United States District Court for the District of New Hampshire

Max Israel, Auctioneer of Henniker, N. H.

WILL SELL ON OCTOBER 29, 1949 AT 2 P.M.

AT PUBLIC AUCTION

at the premises of

DAVIS TRANSFORMER COMPANY, BANKRUPT
295 North State St., CONCORD, NEW HAMPSHIRE

all the physical assets of said company consisting of
REAL ESTATE, INVENTORY, MACHINERY, EQUIPMENT, TOOLS, SUPPLIES AND OFFICE FURNITURE.

Real Estate Includes Land.

MODERN FIREPROOF BUILDING AND CONNECTING WOODEN FRAME BUILDING
45,000 SQUARE FEET OF FLOOR SPACE
Excellent manufacturing location
MAIN LINE RAILROAD SIDING WITH CRANE FACILITIES

EQUIPMENT

Includes power hoists, chain falls, complete paint spray including DeVilbers water back booth, air compressors, power shears up to 72" of 18 gauge, oil pumps, drill presses, bake ovens, metal lathes, winding lathes, carpenter shop equipment, Hobart and Lincoln DC Arc Welders, power presses, hack saws, dip tanks, scales, time clocks, complete office equipment with typewriters, calculators, blueprint machines, desks, chairs, fans. Large quantity of fire extinguishers, small tools, hand trucks. Three trucks—Cherrolet, Dodge and G. M. C. tractor and trailer.

INVENTORY

Includes all parts for a going electrical transformer business including more than 100 sizes of magnet wire, over 50 sizes of insulated lead wires, approximately 200 sizes and types of insulating materials, new and rebuilt transformers from 2 KVA to 75 KVA, tanks, covers, gauges, switches, arrestors, relays over 100 sizes and types of porcelain bushings, large quantity of varnish, paint and solvents, large quantities of steel in angle, channel, flats and silicon sheets, copper bars and rods, brass valves, fittings, fuse links, screws, nuts, bolts, and hardware. Many types of welding rod, large quantities of lugs and connectors.
The trucks will be sold separately for cash at time of sale.
The land, buildings, fixtures, machinery, office furnishing and equipment will be sold as a group subject to mortgage and unpaid taxes totaling $21,438 to date of sale. Purchaser to assume and agree to discharge lien indebtedness. One-third in cash or certified check at time of sale. Balance in ten days. Sale subject to resale as stated below.
Inventory to be sold as a unit. Minimum bid $32,707. Terms: $10,000.00 in cash or certified check at time of sale. Balance in ten days. Sale subject to resale as stated below.
Entire assets, exclusive of trucks, will be resold as unit if bid exceeds total bids for separate groups. Terms: One-third in cash or certified check at time of sale. Balance in ten days.
The Trustee is acting solely as officer of the Court in above sale, and reference is hereby made for a statement of his authority, powers and duties to petition dated October 1, 1949, in the matter of Davis Transformer Company, Bankrupt, in Bankruptcy No. 4986, and the order of the Court thereon. Detailed information as to assets may be obtained by examination of report of appraisal at office of the attorney for the Trustee or at office of the Trustee.
Inspection 9:00 A.M. to 5:00 P.M. daily except Saturdays and Sundays. Other times by appointment.

RALPH E. LANGDELL
Attorney for the Trustee
45 Market St., Manchester, N. H.

B. B. BUTLER
Trustee in Bankruptcy
NEWPORT, NEW HAMPSHIRE

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USED BRASS CONDENSER TUBING WANTED!

If you have used brass condenser tubes ⅞" or 1" o.d. and approximately 2-ft. long for sale, contact me. I am in the market for substantial tonnages from time to time.

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WATTHOUR METERS
FOR SALE
SOCKET TYPE METERS
YOUR INQUIRY SOLICITED
ATLANTIC ELECTRIC METER CORP.
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46 KV, 60 cycle, oil-filled, self-cooled Potential Transformers—2 bushings, full voltage—330/1 turn—38,000/115 V. These transformers never used—original cost $1,001.00. Reasonable offer accepted.

Write Purchasing Department of

RAILWAY and INDUSTRIAL ENGINEERING CO.
GREENSBURG, PA.

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Bids will be received by the Board of Trustees of the Town of Albion, Indiana, for the Municipal power plant equipment, consisting of one (1) Murray steam turbine, 500 K.W., 340 steam pressure; one (1) Moore turbine, 300 K.W., 250 lb pressure; two (2) Keeler water tube boilers, 162 H.P., 250 lb. pressure.

Boilers and turbines are complete with all auxiliaries. All equipment is in A-1 condition and ready for inspection. The right is reserved to reject any and all bids.

Dated this 5th day of October, 1949.

(Signed) Georgiana Erwin,
Clerk-Treasurer.

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WE CAN SUPPLY IT!

Squirrel Cage Motors—
3 Phase, 60 Cycle

H.P.	Make	Type	Volts	Speed
750	G E	KT	2300	720
700	G E	KF-56947	2300	1800
600	Westg	CS-6-344-15	4150	1200
500	G E	K-559DZ	440	3600
500	G E	IK	2300	1800
500	G E	KTF-567	440	1200
500	G E	IK	440	900
400	G E	IK	2200	1800
400	Westg	CS-936	2200	1800
400	Al Ch	ANW	440	900
400	G E	IK	440	600
350	Westg	CS	2200	900
350	G E	IK	440	600
350	G.E.	IK-14	440	514
300	G.E.	FT-559A	440	1800
300	G.E.	IK	440	900
250	G.E.	KT-559	440	1800
250	Westg.	CS-875S	2200	1800
250	G.E.	IK	2200	900
250	G.E.	KT-564	440	900
250	Westg.	CS	440	900
250	G.E.	IK	2300	600
200	Al.Ch.BB	AR	2200	1800
200	Wagner	26V	440	1800
200	Reliance	AA-C60855	440	1200
200	Westg.	CS	2300	1200
200	Westg.	CS-956A	2300	900
200	G.E.	K	2300	720
200	Westg.	CS-32B	440	720
200	Westg.	CS-950A	440	600
200	G.E.	IK-15A	440	450
150	Westg.	CS-771-1C	440	1750
150	Westg.	CS	2200	1200
150	Cont.TEFC	NP-743K	440	900
150	Westg.	CS-950A	440	600
150	G.E.	KT-564	2300	600
125	Westg.BB	CS	440	3600
125	G.E.TEFC	K-6326S	440	1200
125	G.E.	IK	2300	1200
125	Al.Ch.BB	AR-826DS	440	1200
100	G.E.	KT	2300	1800
100	Burke	EM-12.5	220	1200
100	U.S.Vert.	CFU-994A	220/440	1200
100	Al.Ch.BB	ARZ-826	440	900
100	G.E.	K-6333	440	720
75	Al.Ch.	AR-223-BS	2200	1800
75	Al.Ch.BB	AR-505	220/440	1200
75	Al. Ch.	AR	440	1200
75	G E.TEFC	K-505	220	1200

SLIP-RING MOTORS
3 Phase, 60 Cycle
Sleeve Bearing except as noted

H.P.	Make	Type	Volts	Speed
2500	G.E.	MT	6600	257
2000	G.E.	IM	2300	360
1600	Al.Ch.	ANY	2300	257
1200	G.E.	MT-26	2200	277
1000	Westg.	CW-424	4000	500
1000	Westg.	CW	2200	720
800	Westg.	CW	6600/440	507
700	Westg.	CW	2200	720
600	G.E. (3 Brg.)	ID	6600/2300	300
600	G.E.	IM	440	750
600	Cr Wh.	SR	6600	514
600	G.E.	IM	2300	900
500	Ideal	AV-590	2200/4000	1800
500	G.E.	IM	2300	720
500	Al.Ch.	ANY	440	600
500	Westg.	HF	440	400
500	Westg.	CW	2200	600
400	G.E.	MT-412	2300	450
400	Al.Ch	ANY	4000	514
400	Westg.	CW	440	900
400	G.E.	IM	2300	900
350	Westg.	CW	440	720
350	Al.Ch.	ANY	440	585
300	G.E.	IM	440	450
300	G.E.	IM-17B	2300	450
300	G.E.	IM	2300	600
300	Al.Ch.	ANY	2300	720
300	G.E.	IM	440	1200
300	G.E.	IM	2300	1800
250	Westg.	CW-32B	440	900
250	Al. Ch.	ANY	2300	300
250	Al.Ch.	ANY	2300	450
250	Westg.	CW	440	600
250	Al.Ch.BB	ARY-8314	440	720
250	Westg	CW-32B	440	900
200	Al.Ch.BB	ARY-830D	440	900
200	Al.Ch.BB	ARY-826FS	440	1200
200	G.E.	IM	2300	600
150	G.E.	IM	440	450
150	Al. Ch.	ANY	440	600
150	G.E.	IM	2300	720
125	G.E.	IM	2300	720
125	Al.Ch.BB	ARY-826	2300/440	900
125	Al.Ch.BB	ARY-826D	220/440	1200
100	G.E.	IM	440	450
100	Westg.	CW-856C	440	575
100	Al.Ch.	ANY	440	720

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FROM AVAILABLE STOCK

TURBO GENERATORS

KW	Make	Desc.
4000	G E	Auto extraction—250 lbs. I.S.P. 35 lbs. ext.—2300 v. 3 ph. 60 cy.
750	G E	Condensing—250 lbs. I.S.P. 440 v. 3 ph. 60 cy.—Built 1944
450	Whse.	Condensing 250 lbs. I.S.P. 440 v. 3 ph. 60 cy.
400	Whse	Non-condensing 125/150 lbs. I.S.P. 5/10 lbs. B.P.—240/480 v. 3 ph. 60 cy.

SYNCHRONOUS CONDENSERS

KVA	Make	Type	Volts	Speed
5140	Whse.		2400/4150	600
4000	G.E.	TSC	2400/4150	900
3000	Whse		2400/4800	720

MOTOR GENERATOR SETS
3 ph. 60 cy.

KW	Make	Speed	DC Volts	AC Volts
1800	G.E.	600	125/250	2300/4150
1500	G.E.	360	275	2200/4400
1500	G.E.	600	600	2300/4150
1250	G.E.	600	275	4150
1000	Whse.	900	600	4150

TRANSFORMERS—60 Cycle

Kva	Make	Type	Ph	Voltages
2666	Whse.	OISC	1	66000x11000
2500	G.E.	DTQ	1	13200x3300
2500	Al. Ch.	OISC	3	13200x2300
2500	Pack.	AT	3	13800x2300
1250	G.E.	HVDDJ	1	6600x550
1250	Maloney	C	1	4160x240/480
1000	G.E.	HT1	3	13200x480
1000	Pitts.	OISC	1	13200x2300
750	Whse.	OISC	3	33000x2300
600	Al. Ch.	OISC	3	2300/4150x220/440
500	Whse.	OISC	3	13800x230/460
333	Pitts.	OISC	1	2640x2660
167	G.E.	HS	1	2400x240-480

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FOR SALE

10—	1½ KVA Wag	7200—120/240
50—	5 KVA G-E	2300—115/230
6—	5 KVA W-H	13200—120/240
3—	50 KVA W-H	4800/8320Y—120/240
3—	50 KVA Pitts	26400—2300/4000Y
3—	50 KVA G-E	33000—2400/4160Y
3—	75 KVA W-H	230/460—115/230 DRY
3—	100 KVA G-E	11000—2300/4000Y
3—	100 KVA G-E	33000—2300/4000Y
3—	150 KVA L-M	2400/4160Y—120/240
3—	150 KVA G-E	6600—440
3—	150 KVA G-E	22000—2300/4000Y
2—	200 KVA G-E	6900/11950Y—460/230/115
1—	200 KVA G-E	6600/11430Y—2300
3—	200 KVA Mel	7200/12470Y—240/480 25 cyc.
3—	333 KVA G-E	33000—2300/4000Y
1—	400 KVA G-E	132000—120/240

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FOR

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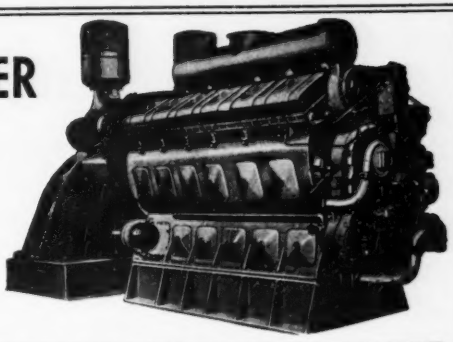
A. C.—50 AND 60 CYCLES

ANY VOLTAGE



A PARTIAL LIST OF OUR INVENTORY

KVA	Make	Model	HP	RPM	KVA	Make	Model	HP	RPM
1875	Fairbanks Morse	33F16	2000	300	375	Enterprise	DSG-6	450	450
1420	Fairbanks Morse	38D8⅛	1600	720	330	Superior	KNA	396	514
1250	General Motors	16-278A	1600	720	312	General Motors	8-268A	450	1200
937.5	General Motors	12-567	1080	720	187	Ingersoll Rand	S	225	514
625	Alco	6-12½x13T	750	600	125	General Motors	3-268A	150	1200
425	Baldwin	VO-6	510	450	75	General Motors	6043C	90	1200

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1—450 HP.—Ridgeway 900 rpm 2200v.
1—125 HP. G.E., 1800 rpm 2300v.
1—100 HP. Whse, 1800 rpm 440v.
1—100 HP. Whse, 1200 rpm 2300-440v.
1— 75 HP. Whse, CS, 1200 rpm, 2200 volts, 3 phase, 60 cycle.
1— 75 HP, 1800 rpm Westinghouse, 440 volt.
1— 75 HP, General Electric Type RT 900 RPM 440 volt.
2—40 HP. G.E., 900 rpm 220v.
40/30 HP. Westinghouse 600/450 44 volt.

MOTORS SLIP RING

1—2500 HP G.E. MT 257 RPM 6600 volt.
2— 150 HP G.E. Type IM 450 RPM 440 volt.
1— 100 HP G.E. Type IM 400 RPM 440 volt.
1— 100 HP G.E. 720 rpm 440v, 25 cy. IM.
75 HP. G.E. 1200 rpm 220v, 60 cy. Vert.
60 HP. West. 900 rpm 2200v. 60 cy. Vert.
50 HP. F.&M. 1800 rpm 220v. 60 cy.

MOTORS—D. C. 230 VOLTS

1—125 HP. G.E. 1800 rpm R.C.
1— 75 HP. 985 rpm General Electric.
1— 50 HP. 700 rpm Crocker-Wheeler.

VARIABLE SPEED—220 VOLTS

1—35 HP. 300/1200 rpm Westinghouse.
1—30 HP. 440/1200 rpm General Electric.
2—25 HP. 650/2200 rpm Westinghouse.
2—25 HP. 500/900 rpm Electric Dynamic.
1—55 HP. 500/1500 rpm General Electric.

MOTOR GEN. SETS

1—1000 KW Westinghouse 275 volt, 720 RPM 4000 volt Syn.
1—1000 KW General Electric 600 volt 514 RPM 4000 Volt Syn.
1—500 KW. G.E. 250v 900 rpm 2300v Syn.
1—500 KW. G.E. 575v 900 rpm 2300v Syn.
1—125 KW. Crocker Wheeler 1200 rpm 125v Generator 2200v S.C. Motor.
1—100 KW. Elect. Mach. 1200 rpm 125v Generator 4150 Syn. Motor.

PLATING GENERATORS

1—1½ KW. G.E. 5/6v with sq. cage mt.
1—12 KW. Hansen Van Winkle 24v 1200 rpm. 20 HP. General Electric KF Motor.
1—3000 Amp. Chandeysson, 6/12v 400 rpm Syn. Motor.
1—2500 Amp. ditto.
1—625 KVA West. Reduction Gear Turbo Generator Non-Condensing, 2400v 3 ph 60 cy.

TRANSFORMERS

1—1000 KVA G.E. 3 ph. 4150 volt to 2400 volt.
3— 400 KVA G. E. 6900 V. Pri.—2300 V. Sec.
3— 300 KVA Pitts. 2300v pri. 115/230v sec.
3— 300 KVA G.E. type H. 2200v pri. 115/230v sec.
3— 150 KVA West. 2300 volt Pri. 240/480 sec.
1— 150 KVA G.E. 2300v 110-220v.
3— 100 KVA G.E. 4150v, 240/480v. Pyranol.
3— 100 KVA G.E. 4150 v. 230/460 v Pyranol.
3— 75 KVA Amer. 2400v, pri. 240/480 sec.
6— 50 KVA West. 2300 v. 120/240 v. Inertrem.

ALTERNATORS & SYNCH. MOTORS

1—2500 KVA Westinghouse, Syn. condenser, 720 rpm 2200v with D.C. exciter.
1—320 KVA Allis Chalmers, 450 rpm 480v.
1—340 KVA General Electric ATB, 600 rpm 240v with D.C. exciter.
1—225 KVA 514 rpm 600v Westinghouse.
4—200/100 HP. Whse. 720/360 rpm 4150v.
1—200 HP. General Electric 257 RPM 440 volt.
1—100 HP. G.E. type TS 600 rpm 4400v D.C.
2—150 HP. Allis Chalmers, 360 RPM. 2300 volt.

Complete Line of A.C. and D.C. Motors and Generators

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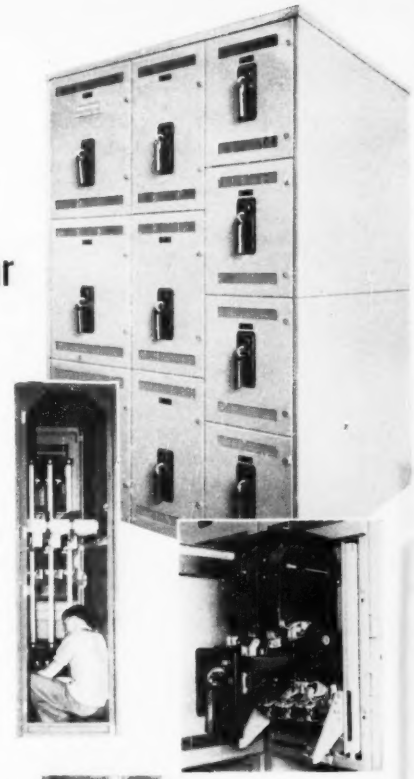
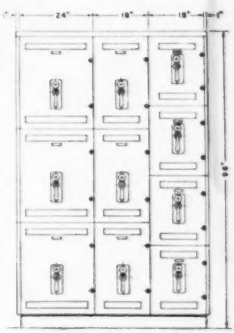
Introducing

MULTUMITE "600"

I-T-E's Improved Low Voltage Switchgear with metal-panel circuit breakers





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The metal panel of I-T-E circuit breakers forms an effective barrier between the bus and breaker compartments and seals off ionized gases.

Control wiring in the bus compartment is now encased in metal wiring troughs . . . an added degree of protection in low voltage switchgear.

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Multumite "600" requires less space. 15,000 amp. IC breakers (KA) can be stacked four-high. Both 15,000 and 25,000 (KB) amp. ratings are in compartments only 18" wide. 50,000 (KC) amp. ratings with or without electrical operation are mounted three-high in frames only 24" wide.

•

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Application: 250 V d-c, 600 V a-c. 15-6,000 amps. continuous ratings. 1 to 4 poles. 15,000, 25,000, 50,000, 75,000 and 100,000 RMS amp. interrupting ratings.

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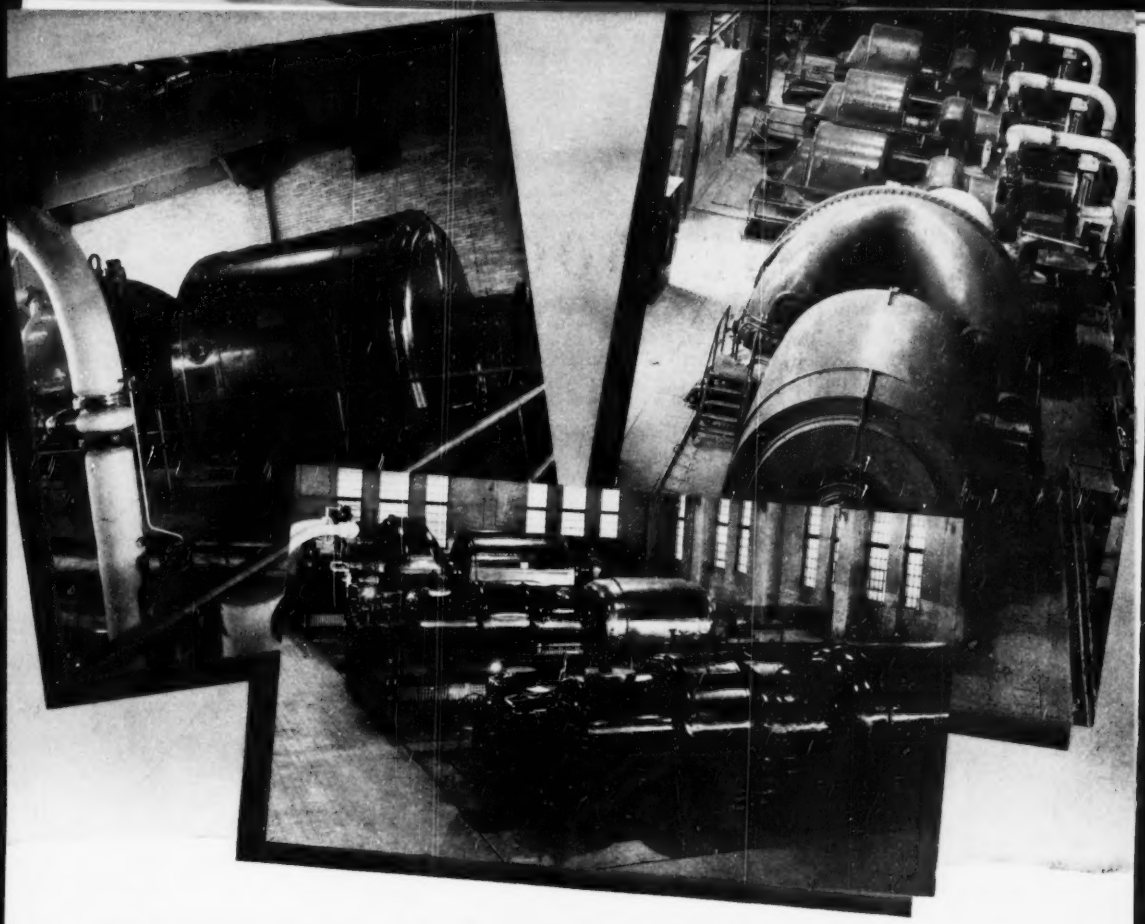

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